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ABSTRACT

This annotated bibliography, compiled by the Office of Medical Education Research and Development, is part of a larger study to assess the status and potential use of simulation technology in medicine. Bibliographic citations are provided for 224 publications dealing with the development, utilization, and evaluation of simulation technology with implications for medical education. Arranged according to categories of simulation--written, audio-video, simulated patients, mannequins, computer simulations, multi-media simulations, and simulation centers, most entries are annotated. An index to 21 medical subject areas is included. (Author/KP)

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OMERAD-76-5

A STUDY OF SIMULATION TECHNOLOGY IN MEDICAL EDUCATION

Appendix D: An Annotated Bibliography

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16. Abstracts

A bibliography of 224 titles related to simulation in medical education, the majority of which are annotated. The references are organized by type of simulation and indexed by medical specialty area.

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Simulation
Education
Medicine
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17b. Identifiers/Open-Ended Terms

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A STUDY OF SIMULATION TECHNOLOGY IN MEDICAL EDUCATION

FINAL REPORT

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This annotated bibliography was compiled by the Office of Medical Education Research and Development (OMERAD) under contract to the National Library of Medicine. It is part of a larger study to assess the status and potential use of Simulation Technology in Medicine. The successful completion of this study was due, in large part, to the creativity and persistance of its project members. The principle members of the Project were:

J. Dennis Hoban, Ed.D., Assistant Project Manager
Sarah A. Sprafka, Ph.D., Project Associate
Nancy Hendershot, R.N., Project Associate
James R. Messick, M.A., Research Associate

We were materially aided in this task by very informed and considerate guidance provided by Harold Wooster, Ph.D., Special Assistant for Program Development, Lister Hill National Center for Biomedical Communications, and Gary Kahn, M.D., of the National Medical Audio-Visual Center.

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We are deeply indebted to Stephen Abrahamson, Ph.D., Howard Barrows, M.D., Richard Friedman, M.D., Fred Tinning, Ph.D., and Christine McGuire, Ph.D. and the Center for Educational Development, University of Illinois College of Medicine, who gratiously provided us copies of specialized bibliographies which complimented ones held by Project members. These formed the basis for an even more exhaustive and complete literature search. In this connection, we also, in the beginning, drew heavily upon Brigham and Kamp, "A Selected Bibliography to Computerized Instruction in the Health Sciences;" Comput Biol Med, 3 (3); 337-42, October, 1973.

Jack L. Maatsch
Project Director

INTRODUCTION

This bibliography compiles publi ations dealing with the development, utilization, and evaluation of simulation technology, with implications for medical education. Accordingly, articles concerning general issues in simulation have been included when they are relevant to simulation in medical education. The articles which appeared most relevant to simulation in medical education have been annotated, except in those cases in which we were unable to obtain a copy of a reference.

The bibliographic entries are organized according to types of simulation and indexed according to medical specialty areas. The simulation catagories are:

Category	Index Abbreviation	Page
Written	W	1
Audio-Video	AV	7
Simulated Patients (includes live simulations, role-playing, and games)	SP	11
Mannequins	M	26
Computer Simulations	C	31
Multi-Media Simulations (hybrid simulations; also includes references dealing with more than one type of simulation)	MM	72
Simulation Centers (simulation laboratories and workshops)	SC	85

The Medical Area Index is organized in the following format:

Medical Area W 1,3,5

This notation indicates that references 1,3, and 5 in the written simulation section deal with this medical area. The line under the 3 indicates that this references is annotated and is more likely to be a central reference.

INDEX BY MEDICAL AREAS

Anesthesiology:

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MM 1, 2, 11, 24
SC 4

Basic Sciences:

M 10, 13
C 4, 5, 6, 7, 10, 14, 36, 37, 42, 44, 45, 47, 50, 69, 85, 86, 87, 88, 91, 111, 122

Dentistry/Oral Surgery:

AV 5
M 3, 6, 7, 8, 11
C 24, 26, 48, 76, 79, 96, 103

Dermatology:

W 6

Emergency Medicine:

W 10
AV 5
M 9
C 64, 65, 109, 118, 119
MM 11

Internal Medicine:

W 4, 11
AV 4
C 5, 6, 11, 12, 18, 25, 32, 33, 37, 38, 49, 63, 65, 67, 70, 78, 95, 99, 109, 118, 119
MM 10, 23, 24

Interviewing/Interpersonal Skills (includes Psychiatry):

W 2, 10
AV 3, 6, 7
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Medical Education:	C	44
	MM	18
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	SP	3, 4, 5, 7, 9, 10, 12, 14, 16, 20, 21 26, 27, 33, 34
	M	4
	C	1, 2, 3, 4, 13, 16, 17, 19, 20, 21, 22, 23, 28, 30, 33, 34, 39, 41, 46, 52, 53, 54, 55, 56, 57, 58, 59, 60, 62, 66, 68, 71, 73, 74, 75, 77, 80, 82, 83, 90, 94, 98, 99, 100, 101, 102, 105, 106, 108, 110, 113, 114, 115, 116, 117, 118, 120, 121, 123, 125, 127, 128
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Ophthalmology:	AV	2
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	MM	23, 24
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	C	5, 104
	MM	24

Pediatrics:	SP	18, 19
	C	97, 109
	MM	19
Pharmacology/Pharmacy:	C	5, 15, 63, 69, 81
Proctology:	AV	1
	MM	24
Public Health:	C	112, 117
Rehabilitation/Physican Therapy:	SP	11
	C	84
Surgery:	C	34, 35, 43, 109

BIBLIOGRAPHY

Written Simulations

1. Andrew, B. J. "An Approach to the Construction of Simulated Exercises in Clinical Problem-Solving," Journal of Medical Education, 47:952-958, December, 1972.

   7 pages 1 reference article
   Descriptors: Historical/Descriptive, Physician Education, Evaluating performance of students or others, National Board of Medical Examiners

   Key Words:
   Diagnostic Skills | Physician Education | Evaluation
   Development | Management Skills

   Describes the construction of Patient Management Problems (PMP's) from the viewpoint of assessing clinical problem solving skills. The author stresses that construction of PMP's must be based on problem solving processes underlying clinical performance. A six stage clinical problem solving model is presented and cognitive skills and knowledge used in clinical management are described. The author indicates that a wide range of problem solving approaches and characteristics, both efficient and inefficient, must be considered when constructing a PMP. A series of steps in construction of PMP's is presented. Different approaches to construction of PMP's for different case studies are illustrated.

2. Froelich, R. E. "Programmed Medical Interviewing: A Teaching Technic," Southern Medical Journal, 59(3):281-283, March, 1966.

   2 pages 0 references article
   Descriptors: Historical/Descriptive, Physician Education, Teaching Students, University of Missouri, Albert Einstein Medical College, Temple University, University of Southern California

   Key Words:
   Communication | Interpersonal Skills | Physician Education

   Describes a method of teaching interviewing through the use of written programmed interviews. Discusses the need for physicians to be skilled interviewers and reviews various methods used to teach interviewing. Gives an example of a programmed interview with patient and student responses.

3. Gover, V. "The NPSI: A Nursing Performance Simulation Instrument," in the American Nurses' Association Eighth Nursing Research Conference by E. Jacobi and L. E. Notter (eds).

44 pages 88 references report
Descriptors: Involves empirical study, Nursing Education, NPSI (Nursing Performance Simulation Instrument), Research, Division of Nursing, Bureau of Health Manpower Education, National Institutes of Health (Grant No. DIO NU-00476), Southern Regional Educational Board

Key Words:

Cognitive Skills	Decision Making	Nursing Education
Reliability	Research	Validity

Describes development and use of the NPSI, a Nursing Performance Simulation Instrument, to test differences in problem solving skills among various groups of nurse educators and practitioners. Establishment of instrument reliability and validity is described. Educators and practitioners were chosen to represent baccalaureate, associate degree, and diploma nursing programs. It was concluded that six of the nine hypotheses were tenable. The author's main hypothesis, that there would be a difference between baccalaureate and associate degree graduates, was not supported.

4. McCarthy, W. H. "An Assessment of the Influence of Cueing Items in Objective Examinations," Journal of Medical Education, 41:263-266, March, 1966.

4 pages 2 references article
Descriptors: Involves empirical studies, Historical/Descriptive, Physician Education, Teaching Students, Evaluating performance of student or others, Research, University of Illinois College of Medicine

Key Words:

Diagnostic Skills	Physician Education

Designed to determine differences in achievement of 20 medical students when tested on two (2) simulated medical problems with and without visual cues. Each problem involved a simulated patient with upper abdominal pain; the first a non-cued, oral response exam, and the second a cued, printed, erasure exam. Students taking the cued exam performed significantly better.

5. McCarthy, W. H. and Gonnella, J. S. "The Simulated Patient Management Problem: A Technique for Evaluating and Teaching Clinical Competence," British Journal of Medical Education, I:348-352, December, 1967.

5 pages 11 references article
Descriptors: Introductory, Historical/Descriptive, Physician Education, Teaching Students, Evaluating performance of students or others, Office of Research in Medical Education, University of Illinois

Key Words:

Diagnostic Skills	Physician Education	Teaching
Evaluation	Management Skills	

Discusses Patient Management Problems (PMP's). Describes how respondents progress through a PMP's using erasable overlay to obtain immediate feedback and take multiple routes to solution. Other aspects of the PMP are briefly described: programming a theraputic (management) or diagnostic (assessment) problem, sources of clinical case studies, scoring of PMP, problems in PMP use, and use of PMP in teaching.

6. McGuire, C. H. "Evaluation in Dermatology," Archives of Dermatology, 91:303-312, April, 1965.

10 pages 0 references article
Descriptors: Historical/Descriptive, Physician Education, Evaluating performance of students or others, University of Illinois College of Medicine

Key Words:

Development	Diagnostic Skills	Evaluation
Management Skills	Physician Education	Reliability

Explains rationale behind various methods of evaluation, leading up to development of paper and pencil simulations of physician-patient encounters. These simulations, which are of various types, provide initial patient data, and the student chooses strategies to diagnose and treat the patient. Scoring standards are established using a criterion group of experienced physicians. Evaluation results are used to measure competence and as a guide to further learning. The advantages of this type of evaluation over oral exams are economy of administration, objective scoring, and adequate sampling of knowledge.

Written Simulations

7. McGuire, C. H. and Babbott, D. "Simulation Technique in the Measurement of Problem-Solving Skills," Journal of Educational Measurement, 4:1(Spring, 1967) pages 1-10.

10 pages 13 references article
Descriptors: Historical/Descriptive, Physician Education, Patient Management Problems, Evaluating performance of students or others, Center for Study of Medical Education, University of Illinois, College of Medicine

Key Words:

Reliability	Validity	Evaluation
Diagnostic Skills	Physician Education	Development
Management Skills		

Part of a four (4) section report on construction, scoring, reliability and validity of Patient Management Problems (PMP's). This section presents the general characteristics of problems which they have developed. The unique characteristic of these particular problems is sequential branching in which each decision is based on earlier decisions. The same problem will change for each respondent resulting in more than one acceptable outcome. It describes how a respondent works through sequential decisions. Briefly, it summarizes scoring procedures, validity and reliability of these problems.

8. McGuire, C. H. and Solomon, L. M. (eds.) Clinical Simulations. Selected Problems in Patient Management. Appleton-Century-Crofts/Educational Division--Meredith Corporation, New York, 1971.

302 pages 0 references book
Descriptors: Historical/Descriptive, Physician Education, Patient Management Problems, Teaching students, Evaluating performance of student or others, Interdepartmental Appraisal Committee, University of Illinois, College of Medicine, Christine H. McGuire, Lawrence M. Solomon and George E. Miller, Center for Educational Development, University of Illinois, Chicago

Key Words:

Management Skills	History	Neurology
Ob/Gyn	Pediatrics	Otorhinolaryngology
Decision Making	Evaluation	Gastroenterology

The book describes in detail 20 clinical problems in the form of a structured question and answer format, answers being obtained by rubbing with a special marker. The problems involved are pale, lethargic child (4), an acute abdomen, a nervous patient with a sore throat, low back pain, the pregnant diabetic, the unreliable patient, a complicated abdominal problem, a pale confused patient, What is wrong with my ear?, the severely traumatized patient, a uterine cervical lesion (2), the severely breath-limited patient, a urinary problem in a child, the surgical abdomen, headache in a child, headaches and spots. Appendices for comment and recommended management are provided.

Written Simulations

9. McGuire, C. H., Solomon, L. and Bashook, P. Construction and Use of Written Simulations. Harcourt-Bruce-Jovanovich, Spring, 1976.

5 references book
Descriptors: Methodological, Physician Education, General, Teaching Students, Center for Educational Development, University of Illinois, College of Medicine

Key Words:

Development	Diagnostic Skills	Evaluation
Management Skills	Physician Education	Process Models
Reliability		

Outlines step-by-step the process of constructing and evaluating written simulations. Also, discusses advanced designs and special applications.

10. McIntyre, H. M., McDonald, F. J., Bailey, J. T. and Claus, K. K. "A Simulated Clinical Nursing Test," Nursing Research, 21(5):429-435, September-October, 1972.

7 pages 10 references article
Descriptors: Involves emprical study, Nursing Education, Evaluating performance of students or others, Research, School of Nursing, University of California-San Francisco, National Institutes of Health (Research Grant No. NU-00072)

Key Words:

Curriculum	Diagnostic Skills	Development
Emergency Medicine	Evaluation	Interpersonal Skills
Nursing Education	Reliability	Research
Validity		

Describes development and use of paper and pencil simulation to evaluate problem solving skills of senior baccalaureate nursing students in experimental curriculum at University of California at San Francisco. "In 12 sections, the test followed the sequence of a patient's experience from the time of his arrival at the emergency room through a period of time after his return...home. The test has two parts: in a controlled response section a set of alternative actions were listed from which the student chose a preferred action; in a free response section a problem was presented for the student to solve. Fine scoring systems were developed. Results from administering the test to 1966 (control class), 1967, 1968, and 1969 (experimental classes) graduates are presented." (Quoted from abstract, page 429). Experimental classes had significantly higher scores on certain criterion measures.

Written Simulations

11. Palva, I. P. "Measuring Clinical Problem Solving," British Journal of Medical Education, 8:52-56, 1974.

5 pages 0 references article
Descriptors: Historical/Descriptive, Physician Education, Evaluating performance of students or others, University of Oulu, Oulu, Finland

Key Words:

Physician Education	Validity	Reliability
Hematology	Diagnostic Skills	

Describes a simple and inexpensive method of assessing clinical problem solving skills using written simulations with coded and free answers. Simulated patients are constructed from real ones with hematological problems. A method of scoring using positive marks for correct answers, negative marks for harmful and wrong answers and zero marks for wrong but unharmful answers was employed. Test reliability was good but validity could not be verified.

Audio-Video

1. Bentivegna, S. S. Teaching Diagnostic Oncology at New York Medical College Utilizing the Tutorendoscope System for Cancer Detection. New York, New York: New York Medical College, Department of Surgery, Prepublication Report, 1974.

   3 pages 8 references report
   Descriptors: Historical/Descriptive, Physician Education, Teaching Students, Evaluating performance of students or others, Department of Surgery, New York Medical College, National Cancer Institute, Public Health Service (Grant No. 5712-CA-08075), H. David Markman, M.D., Albert Einstein School of Medicine

   Key Words:

Tutorendoscope	Sigmoidoscopic Proctotrainer
Oncology	Colonoscopic Proctotrainer
Evaluation	Broncoscopic Tutorendoscope

   A thorough description of the Tutorendoscope System, a self-contained teaching system using color transparencies which is used in conjunction with the Sigmoidoscopic Procto-trainer. Other applications discussed are in teaching Bronchoscopy, Colonoscopy, and Esophago-gastro-duodenoscopy. A highly positive evaluation by medical students is reported.

2. Creech, J. C. and Arsham, G. M. "Development, Validation and Dissemination of Instructional Materials: An Analysis," Medical Education, 10:1-5, 1976.

   5 pages 6 references article
   Descriptors: Historical/Descriptive, Physician Education, Red Eye and External Disease, Ocular Emergencies, Teaching Students

   Key Words:
   Physician Education Ophthalmology Diagnostic Skills
   Evaluation

   Describes activities of Self-Instructional Materials in Ophthalmology (SIMA), a 2 year project to develop four (4) slide/tape units and one (1) videocassette in basic ophthalmology for medical students. Observations, pitfalls in developmental process, data on production, evaluation, and factors in effective dissemination are presented.

Audio-Video

3. Enelow, A., Adler, L. and Wexler, M. "Programmed Instruction in Interviewing: An Experiment in Medical Education," Journal of Medical Education, 212(11):1843-1846, June 15, 1970.

4 pages 4 references article
Descriptors: Historical/Descriptive, Physician Education, Teaching Students, College of Human Medicine, Michigan State University, School of Medicine, University of Southern California

Key Words:

Actors	Cognitive Skills	Evaluation
Interpersonal Skills	Role Playing	Physician Education
Self-Instruction	Continuing Medical Education	Videotape

Some principles of programmed instruction were applied in producing videotapes for the purpose of teaching interviewing skills. The goal was to teach the physician or medical student to recognize behaviors of an interviewer which either encourage or hinder useful communication with the patient. The optimal interview was defined as one in which the greatest amount of information relevant to diagnosis and treatment is obtained within realistic time limits. A single principle is portrayed in each tape. Students respond to questions at intervals during the tape. Evaluation research indicates significant learning by medical students and physicians.

4. Levinson, D. "A New Audiovisual Aid to Heart-Sound Instruction," Journal of the American Medical Association, 205:105-106, 923, September 23, 1968.

3 pages 4 references article
Descriptors: Historical/Descriptive, Physician Education, Heart Sound Simulator, Teaching Students, University of Rochester, New York, School of Medicine and Dentistry, Audio-Visual Products Division, Bell and Howell Company, Chicago, Arthur Moss, Gerald Murphy, Pravin Shah

Key Words:

Physician Education	Teaching	Cardiology
Diagnostic Skills		

Presents a description of a heart sound simulator. Sounds are recorded on magnetic tape or punch cards. Cards are inserted into a Language Master Tape Recorder to produce sounds. In addition to taped sounds, cards have a written description of sound sequence, textbook references and graphic representation of sounds.

Audio-Video

5. Mullaney, T. P., Duell, R. C., Smith, T. A. and Blair, H. A. "Programmed Simulation of Clinical Endodontic Problems," Journal of Dental Education, pp. 37-39, November, 1972.

3 pages 2 references article
Descriptors: Involves empirical study, Dental Education, Teaching Students, Research, University of Kentucky, College of Dentistry

Key Words:

Dental Education	Diagnostic Skills	Emergency Medicine
Management Skills	Research	

Describes an experimental study in which simulated endodontic problems were presented to the experimental group using slide-tape presentations. Both the experimental and the control groups received lecture-discussion presentations. The experimental group performed significantly better on exams testing diagnosis but not treatment of endodontic conditions.

6. Ramey, J. W. "Teaching Medical Students by Videotape Simulation," Journal of Medical Education, 43:55-59, January, 1968.

5 pages 6 references article
Descriptors: Historical/Descriptive, Theoretical/Conceptual, Methodological, Physician Education, Teaching Students, Institute for the Advancement of Medical Communication, Philadelphia, Pennsylvania, Center for Continuing Medical Education, New York City

Key Words:

Videotape	Simulated Patients	Role Playing
Physician Education	Communication	Interpersonal Skills

Ramey described a course at the University of Missouri School of Medicine designed to give medical students a "dry run" through the use of videotape, prepared situations, re-takes and group discussions. Issues included ethical concerns, decision making concerns, family and patient management issues.

7. Santiesteban, A. J. "The Use of Psychological Models in Medical Education," Journal of Medical Education, 50(6):636-637, June, 1975.

2 pages 2 references article
Descriptors: Introductory, Physician Education, Teaching Students, Sargent College of Allied Health Professions, Boston University, Boston, Massachusetts

Key Words:

Actors	Communication	Interpersonal Skills
Nonverbal Communication	Physician Education	Process Models
Simulated Patients	Videotape	

Recommends using principles of modeling as set forth by Bandura to teach interviewing skills. The model can be presented on audio or videotape, depending on whether the behavior is primarily verbal or both verbal and nonverbal. Other teaching methods such as feedback, can enhance the effectiveness of the modeling.

8. Wittkopf, B. "Self-Instruction for Student Learning," American Journal of Nursing, 72(11):2032-2034, November, 1972.

3 pages 0 references article
Descriptors: Historical/Descriptive, Nursing Education, Teaching Students, College of Nursing, South Dakota State University, School of Nursing, University of Wisconsin at Milwaukee, Health, Education and Welfare, U.S. Public Health Service (Grant No. D10 NU-0015-03), Elizabeth Krueger

Key Words:

Cognitive Skills	Nursing Education	Psychomotor Skills
Self-Instruction	Simulation Laboratory	

Describes audio-visual teaching laboratory and various equipment and media materials, including simulations for teaching nursing procedures and closed circuit TV for viewing clinical situations.

Simulated Patients

1. Abt, C. C. Serious Games. New York. New York: The Viking Press, 1971.

   176 pages 0 references book
   Descriptors: Introductory, Historical/Descriptive, General Education, Teaching Students, Abt Associates, Inc.

   Key Words:

Audio Visual	Cognitive Skills	Costs
Curriculum	Development	Games
Interpersonal Skills	Management Skills	Teaching

   Book describes background and rationale of educational games and their uses and advantages. A number of specific games are described, including four in appendices. Chapter titles are: Reunion of Thought and Action; Improving Education with Games; Educational Games for Physical and Social Sciences; Game Learning and Disadvantaged groups; Games for Occupational Choice and Training; Games for Planning and Problem-Solving in Government and Industry; How to Think With Games by Designing Them; How to Evaluate the Cost-Effectiveness of Games; the Future of Serious Games.

2. Bamford, J. C., Jr. "The Simulated Patient in Clinical Teaching," Journal of Surgical Research, 11(11):563-569, November, 1971.

   7 pages 1 reference article
   Descriptors: Historical/Descriptive, Physician Education, Teaching Students, Evaluating performance of students or others, New York Medical College, New York, New York, Marvin Seiger

   Key Words:

Actors	Communication	Interpersonal Skills
Physician Education		

   Describes the use of simulated patients to improve medical students' skill in interviewing patients with marital and/or sexual problems. Discusses training of "patient" and the interview setting. The students were not told the patients were actors. Feedback from the actor-patients was given through the instructors. Discusses reactions of students and actor-patients, which were generally positive.

Simulated Patients

3. Barlow, D. J. and Bruhn, J. G. "Role-Plays on Television--A New Teaching Technique," Nursing Outlook, 21(4):242-244, April, 1973.

3 pages 0 references article
Descriptors: Historical/Descriptive, Nursing Education, Teaching Students, University of Pittsburgh, Oklahoma Regional Medical Program

Key Words:
Nursing Education Role-Playing Interpersonal Skills

The Oklahoma Regional Medical Program used a series of TV role-playing simulations developed at the University of Pittsburgh designed to help nursing service personnel in the identification and care of patient needs. The 20 minute role-playing situations consisted of good, mediocre, and inappropriate nursing behavior. The study deals with a presentation before 260 practicing nurses. The role-playing was followed by a 10-minute on-screen discussion between a nurse coordinator and the nurse participant. This was followed by discussion groups amoung leaders with accompanying guides to nurse coordinators on location. Nurse leaders had an easier time discussing attitudes and behaviors than in recommending solutions except for situations with which they could empathize. The ability of a nurse coordinator to lead group discussions was essential.

4. Barrows, H. S. "Simulated Patients in Medical Teaching," The Canadian Medical Association Journal, 98:674-676, April 6, 1968.

3 pages 2 references article
Descriptors: Introductory, Historical/Descriptive, Physician Education, Teaching Students, Evaluating performance of students or others, Continuing Education, University of Southern California at Los Angeles

Key Words:
Physician Education Neurology Evaluation
Continuing Education Actors

The uses of simulated patients in physician education are discussed. The advantages of simulated patients and procedures for training them are described. Discusses four (4) uses of simulated patients: (1) models for anatomy classes, (2) models to simulate a variety of conditions in continuing education workshops in neurology, (3) models to evaluate clinical performance of third year medical student's clerkship in neurology, and (4) subjects to demonstrate the neurological evaluation in workshops or in larger medical school classes.

5. Barrows, H. S. Simulated Patients (Programmed Patients). Springfield, Illinois: Charles C. Thomas, 1971.

   63 pages 11 references book
   Discriptors: Introductory, Involves empirical study, Historical/Descriptive, Physician Education, Teaching Students, University of Southern California, Michigan State University, McMasters University, Oklahoma University, Abrahamson, Hilliard Jason, Lee Shulman, Arthur Elstein, Alan Enelow, George Miller, Theodore Kurze

   Key Words:
   Physician Education Diagnostic Skills Interpersonal Skills

   A monograph description of history and involvement of simulated patients. It was written for those without skill in training simulated patients in order to help them understand training techniques. Included are Educational Values of Simulation and its Relationship to Medicine, the Simulated Patient, Training of the Simulated Patient, Evaluation of Clinical Performance, Present Uses of Patient Simulation in Medical Education, Future Uses of the Simulated Patient, including a detailed example of a protocal involving a simulated patient with multiple sclerosis.

6. Barrows, H. S. and Abrahamson, S. "The Programmed Patient: A Technique for Appraising Student Performance in Clinical Neurology," The Journal of Medical Education, 39:802-805, August, 1964.

   4 pages 3 references article
   Descriptors: Introductory, Historical/Descriptive, Physician Education, Evaluating performance of students or others, University of Southern California, School of Medicine, Los Angeles

   Key Words:

Actors	Neurology	Physician Education
Diagnostic Skills	Interpersonal Skills	Evaluation

   Discusses uses of simulated patients to evaluate clinical performance and provides examples of their use with junior medical students in Neurology clerkship. Describes problems in using traditional techniques of observation and oral evaluation of clinical competence and suggests simulated patients can overcome the difficulties of these evaluation procedures. Discusses training of the actor, presentation of case to student, and evaluative criteria which include student's write-up of the case and simulated patient's evaluation of student performance.

Simulated Patients

7. Beals, P. E. Classroom Simulation as a Substitute for Live Pre-Student Teaching Laboratory Experiences. Shippensburg, Pennsylvania: Shippensburg State College.

8. Burra, P. "Role-Playing: A Method of Teaching Interpersonal Skills," Canadian Psychiatric Association Journal, 17(3):189-193, June, 1972.

5 pages 9 references article
Descriptors: Historical/Descriptive, Physician Education, Teaching Students, Queen's University, Kingston, Ontario, Canadian Psychiatric Association

Key Words:
Communication Interpersonal Skills Physician Education
Psychiatry Role Playing

Discusses teaching interpersonal skills to medical students in psychiatry clerkship through the use of role playing. The teaching is carried out in small groups, each group having four sessions. Students in the class assume the role of a patient or physician conducting an interview. After the first session, the students write the physician and patient protocols. The format is to have the interview first, followed by a group discussion. The article describes some of the changes in format that have been tried. Students, in evaluating two teaching methods, preferred role playing to another type of group discussion.

9. Butt, R. The Advantages of Simulation and Gaming as Instructional Devices: Changing Classroom Transactions. Montreal, Quebec, Canada: McGill University Center for Learning and Development, 6(3), December-January 1975.

6 pages 7 references paper
Descriptors: Introductory, General Education, Teaching Students, McGill University, Montreal, Quebec

Key Words:
Curriculum Development Games
Process Models

Briefly describes uses of simulations and games and two of their advantages--their multidimensional nature and potential to change classroom interactions. Lists some sources and references. Recommends constructing one's own simulations and games. Briefly describes some popular games.

10. Corley, J. B. "Practical Applications of Patient--Simulation Techniques in the Evaluation of Clinical Competence," Paper presented at a Conference on Evaluative Methods in Undergraduate Psychiatry at the University of Illinois, June 1972.

    20 pages 0 references paper
    Descriptors: Historical/Descriptive, Physician Education, Evaluating performance of students or others, College of Family Physicians of Canada

    Key Words:

Family Medicine	Evaluation	Certification
Actors	Reliability	

    Discusses use of simulated patients to evaluate residents in Family Medicine for Board Certification by the College of Family Practice of Canada. Actors are trained in one (1) hour to portray cases and example cases are provided. Examiners train for one (1) day by observing peers in interaction with patient and through video playbacks of interview. Examination of each physician with simulated patient takes approximately 12 minutes. Examiners evaluate encounter using 2 scales: (1) objective checklist indicating inclusion or exclusion of critical items, and (2) subjective assessment in 5 areas (factual knowledge, observation, interaction, problem solving, attitudinal skills, overall performance). Describes derivation of formal test score from raw scores. Concludes with general observations on simulated patients, discusses ways to increase ratio reliability, and presents reliability estimates for 15 teams of examiners. Appendix includes instructions to examiners and rating forms.

11. Dinnerstein, A. J. and Lowenthal, M. "Teaching Demonstrations of Simulated Disability," Archives of Physical Medicine and Rehabilitation, 49:167-169, March, 1968.

    3 pages 4 references article
    Descriptors: Historical/Descriptive, Physician Education, Nursing Education, Simulated Disabilities, Teaching Students, New York Medical College, Center for Chronic Disease, Department of Rehabilitative Medicine

    Key Words:

Neurology	Teaching	Physician Education
Nursing Education	Allied Health Education	Role Playing
Interpersonal Skills		

11. Dinnerstein, A. J. and Lowenthal, M., Continued from previous page.

Students are given a simulated patient's eye view of neurologic disability by having them attempt to talk and to walk under conditions of distorted sensory inflow. The normal auditory feedback of speech is delayed for 200 msec. by means of a modified tape recorder; under conditions of delayed feedback the resulting speech is often disrupted and distorted as in severe stuttering. A fixed or variable lateral rotation of the visual field by means of special goggles produces a loss of balance and an ataxic gait. In teaching, the above demonstrations are used along with lecture to impress students with the potential contribution of afferent malfunction in physical disability. Moreover, by experiencing a simulated patient's eye view of neurologic disability, and seeing their fellow students in a similar state, the students may become more able to establish and maintain adequate rapport with patients having these disabilities.

12. Fletcher, J. L. and Dobbins, A. L. An Approach to Evaluating Learning in Simulation Games. Educational Technology Publications, 1971.

13. Froelich, R. E. "A Course in Medical Interviewing," Journal of Medical Education, 44(12):1165-1169, December, 1969.

5 pages 9 references article
Descriptors: Historical/Descriptive, Physician Education, Teaching Students, University of Oklahoma, School of Medicine

Key Words:

Actors	Audiovisual	Communication
Interpersonal Skills	Physician Education	Role Playing
Videotape		

Describes a course to teach interviewing to medical students in six (6) steps: (1) role playing, (2) responses used by physicians, (3) role playing and programmed patients, (4) observation of skilled interviewers, (5) interviewing live patients, and (6) writing the history. Student and faculty time to complete course are given.

Simulated Patients

14. Gibbs, G. E. (ed.) Handbook of Games and Simulation Exercises. Beverly Hills, California: Sage Publications, Inc., 1974.

226 pages 0 references book
Descriptors: Introductory, Historical/Descriptive, General Medicine, Teaching Students

Key Words:

Audio Visual	Bibliography	CAI
Cognitive Skills	Decision Making	Development
Games	Interpersonal Skills	

Gives an introduction to the design and use of games, terminology, an extensive bibliography, and a register of gaming societies and associations in the United Kingdom and the United States. Also listed are nearly 2000 games and simulations with details of content, audience, and suppliers. The games range in levels from preschoolers to adult learners and cover a wide range of subject matter.

15. Godkins, T. R., Duffy, D., Greenwood, J. and Stanhope, W. D. "Utilization of Simulated Patients to Teach the 'Routine' Pelvic Examination." Journal of Medical Education, 49(12):1174-1178, December, 1974.

5 pages 9 references article
Descriptors: Historical/Descriptive, Allied Health Education, Teaching Students, Evaluating performance of students or others, University of Oklahoma, College of Medicine, University of Iowa, University of Washington, Robert M. Kretzschmer, Louis Vontuer

Key Words:

Ob/Gyn	Allied Health Education	Psychomotor Skills
Interpersonal Skills	Teaching	

Focuses on the use of simulated patients to teach and evaluate pelvic examination of Physician Associates at the University of Oklahoma. Briefly describes use of simulated patients at the Universities of Iowa and Washington (Seattle). Discusses organization of program using simulated patients, objectives of program, and training of simulated patients. Concludes by discussing the advantages of simulated patients as an effective teaching and evaluation experience for students, as beneficial to patients, and as a cost saving program in terms of physician time.

16. Greenblat, C. S. and Duke, R. D. Gaming-Simulation: Rationale, Design, and Application. A Text with Parallel Readings for Social Scientists, Educators, and Community Workers. New York, New York: Sage Publications, Halsted Press Division John Wiley and Sons, 1975.

435 pages 0 references book
Discriptors: Historical/Descriptive, Theoretical/Conceptual, Methodological, General Medicine, Teaching Students

Key Words:

Cognitive Skills	Computer Simulations	Development
Evaluation	Games	Interpersonal Skills
Research	Teaching	

Includes reprinted and original articles that present an overview of the gaming literature and an in-depth analysis of selected topics. Part I presents an overview of the nature of gaming and rationale of gaming simulation. Part II examines the elements of game design and construction. Part III covers the uses of gaming simulation for education and training. Part IV examines new areas and applications of gaming, including public policy, urban planning, and social research.

17. Hayes, D. M., Hutaff, L. W. and Mace, D. R. "Preparation of Medical Students for Patient Interviewing," Journal of Medical Education, 46(10):863-868, October, 1971.

6 pages 9 references article
Descriptors: Introductory, Historical/Descriptive, Methodological, Physician Education, Teaching Students, Evaluating performance of students or others, developing course for interviewing physician self-awareness, Bowman Gray School of Medicine, Winston-Salem, North Carolina

Key Words:

Decision Making	Evaluation	Communication
Role Playing	Interpersonal Skills	Physician Education

Description of a year-long new course in patient interviewing. Objectives included physician sensitivity to patients, understanding of emotional components in illness, and physician self-awareness. Coursework included lectures, demonstration interviews, role playing, special seminars, personal interviews and an evaluation of the course.

Simulated Patients

18. Helfer, R. "An Objective Comparison of the Pediatric Interviewing Skills of Freshman and Senior Medical Students," Pediatrics, 45(4):623-627, April, 1970.

5 pages 6 references article
Descriptors: Involves empirical study, Physician Education, Simulated Mothers, Research, University of Colorado, Medical School

Key Words:
Pediatrics Interpersonal Skills Physician Education
Research

Study compares senior and freshmen medical students on their ability to conduct pediatric interviews with simulated mothers. Women were programmed to simulate the mother of a child with an organic disorder with associated psychological or interpersonal problems. Freshman and senior medical students interviewed mothers. The interviews were videotaped and coded for analysis. The results indicate that freshmen asked fewer leading questions and obtained more information related to interpersonal aspects of the problem than seniors. Seniors obtained more factual organic information. This suggests that as a student progresses in medical programs, basic interviewing skills are altered by an overriding concern with organic pathology and a desire to obtain factual data. The results contradict a commonly held assumption that a medical student's ability to conduct a pediatric interview is developed during the medical program.

19. Helfer, R., Black, M. and Helfer, M. "Pediatric Interviewing Skills Taught by Nonphysicians," American Journal of Diseases of Children, 129:1053-1057, September, 1975.

5 pages 10 references article
Descriptors: Involves empirical study, Historical/Descriptive, Physician Education, Teaching Students, Michigan State University, Department of Human Development

Key Words:
Pediatrics Communication Teaching
Interpersonal Skills Physician Education

Describes a program to teach pediatric interviewing skills using trained mothers as teachers. The objective of the Pediatric Interview Program at Michigan State University was to teach third year medical students skills of interviewing mothers about their children. Mothers were screened, trained in being interviewed, and trained in giving feedback to students. Cases used during the interviews were derived from a history provided by the mothers. Students interviewed the trained mothers to obtain pediatric history. Interviews were videotaped. Mothers gave feedback to students about the interview process. Evaluation of the program indicates that mothers were as good as pediatrician instruction in helping students learn the interview process. Students, faculty and administration reacted favorably to the program. The program can effectively use trained non-physicians to teach pediatric interview skills at a savings of the physicians' time and expense.

Simulated Patients

20. Holdman, H. The Training of Simulated Patients. East Lansing, Michigan: Michigan State University, Office of Medical Education Research and Development, College of Osteopathic Medicine, College of Human Medicine, 1976.

96 pages 18 references masters thesis
Descriptors: Theoretical/Conceptual, Master's Thesis, Physician Education, Nursing Education, Teaching Students, Evaluating performance of students or others, Fred Tinning, Jack Maatsch

Key Words:

Actors	Communication	Education
Interpersonal Skills	Non-verbal Communication	

A manual that covers the aspects of the process, training, performance, and evaluation of simulated patients in medical education. Its purpose is to show how to train and maximize the use of simulated patients.

21. Inbar, M. and Stoll, C. "Games and Learning," Interchange, 1:53-61, 1970.

22. Johnson, G. H., Brown, T. C., Stenchever, M. A., Gabert, H. A., Poulson, A. M. and Warenski, J. C. "Teaching Pelvic Examination to Second Year Medical Students Using Programmed Patients," American Journal of Obstetrics and Gynecology, 121(5):714-717, March 1, 1975.

5 pages 6 references article
Descriptors: Involves empirical study, Historical/Descriptive, Physician Education, Teaching Students, Evaluating performance of students or others, University of Utah, Medical Center

Key Words:

Interpersonal Skills	Live Models	Evaluation
Physician Education	Ob/Gyn	Research

Assesses value of using programmed patients to teach pelvic examination skills to sophmore medical students. Students taught using programmed patients were compared with those taught in the previous year using lecture, film, and a pelvic exam model (GYNNY). The experimental group received the same instruction, with the addition of one exam of a programmed patient. The authors conclude that the new method was well accepted by students and faculty and adds realism to the study of obstetrics and gynecology.

Simulated Patients

23. Kretzschmar, R. M. "Teaching Program Review," Newsletter No. 2 of the Steering Committee for Cooperative Teaching in Obstetrics and Gynecology. Department of Obstetrics and Gynecology, University of Utah, College of Medicine, January, 1971.

6 pages 0 references newsletter
Discriptors: Historical/Descriptive, Physician Education, Teaching Students, Evaluating performance of students or others

Key Words:

Actors	Evaluation	Ob/Gyn
Interpersonal Skills	Physician Education	

Discusses three aspects of a program to teach pelvic examination skills. (1) Professional patients are programmed to teach interpersonal skills during a gynecological interview. The interviews are audiotaped and used by the physician-instructor and professional patient to teach specific interviewing skills. (2) Discusses development and use of the "Patient-Physician Rating Scale." All clinic patients seen by students complete the scale, and these are given to the students weekly for purposes of feedback. (3) Two professional patients working as a team teach and evaluate pelvic examination skills of students.

24. Lane, V. A Simulated Patient Situation Approach to Teaching Labor and Delivery. Kentucky: University of Kentucky, College of Nursing.

25. Levine, H. G. and McGuire, C. H. "Role Playing as an Evaluative Technique," Journal of Educational Measurement, 5(1):1-8, 1968.

9 pages 6 references article
Descriptors: Methodological, Physician Education, Evaluating performance of students or others, University of Illinois, College of Medicine, Chicago, U.S. Public Health Service, Bureau of Health Manpower

Key Words:

Actors	Certification	Diagnostic Skills
Evaluation	Interpersonal Skills	Physician Education
Reliability	Research	Validity
Role Playing		

Three role playing situations were developed to evaluate resident physicians taking a major medical specialty board exam. The exams were a simulated diagnostic interview, simulated proposed treatment interview, and simulated patient management conference. Procedures for administration are described. Reliability was adequate on two exams but low on the third. Content validity met acceptable standards. Construct validity data were not definitive.

Simulated Patients

26. Lodzia, G. de "Procedural Training: The Next Step in Medical Education," Journal of Medical Education, 45(6):421-433, June, 1970.

13 pages 2 references article
Descriptors: Historical/Descriptive, Physician Education, Teaching Students

Key Words:

Physician Education	Process Models	Curriculum
Decision Making	Diagnostic Skills	

Deals with philosophical questions of medical education and proposes that in order to meet current demands on practioners a curriculum should be developed that encompasses a realistic approach to the study of medicine--procedural knowledge--an interdisciplinary approach grounding the student in epistemology with the study of philosophy and the art of medicine. A model for procedural education is included as well as a discussion of game theory.

27. Maatsch, J. L. An Introduction to Patient Games: Some Fundamentals of Clinical Instruction. East Lansing, Michigan: Michigan State University, Office of Medical Education Research and Development, 1974.

28 pages 0 references booklet
Descriptors: Introductory, Historical/Descriptive, Physician Education, Teaching Students, Evaluating performance of students or others, Michigan State University

Key Words:

Physician Education	Diagnostic Skills	Interpersonal Skills
Management Skills	Decision Making	Evaluation
Games	Role Playing	Teaching

A booklet designed for medical school faculty who are considering using patient games for the first time. This booklet includes a definition of patient games, four basic principles of effective clinical instruction, individualized clinical instruction and evaluation with students, small group instruction (30+), and other instructional uses of patient games.

Simulated Patient

28. MacNamara, M. "Teaching Interpersonal Skills. The Use of Role Playing With Sixth-Year Medical Students," Medical Journal of Australia, 2(18):918-925, October 30, 1971.

7 pages 38 references article
Descriptors: Historical/Descriptive, Physician Education, Teaching Students, University of Adelaide, Adelaide, South Australia

Key Words:
Communication | Interpersonal Skills | Role Playing
Nonverbal Communication | Physician Education

Discusses teaching interpersonal relationship skills to medical students through a combination of home visiting and role playing. Reviews a number of articles and studies regarding doctor-patient relationships. Discusses advantages as well as problems of home visiting. Describes how role playing is carried out and what students feel they learn from this method of teaching.

29. Pasquali, E. and Joyce, B. "An Approach to Teaching Empathy," New York State Nursing Association Journal, 6(3):10-12, November, 1975.

3 pages 4 references article
Descriptors: Introductory, Nursing Education, Teaching Students, Adelphi University, Garden City, New York

Key Words:
Interpersonal Skills | Nonverbal Communication | Nursing Education
Role Playing

Describes the use of simulation to help nursing students learn empathy. The simulation included the student's assuming a self-selected handicap for a day, while classmates assumed the role of "nurse" and accompanied the "patient" to meet needs and provide support. Students reported becoming more aware of both their own and others' reactions to their "handicaps."

30. Resnikoff, A. The Relationship of Counselor Behavior to Client Response and an Analysis of a Medical Interview Training Procedure Involving Simulated Patients. (Doctoral Thesis), East Lansing, Michigan: Michigan State University, College of Education, 1968.

31. Schneider, P. B. and de Perrot, E. "Role Playing as an Instrument for Teaching and for Research into the Doctor/Patient Relationship," Psychotherapy and Psychosomatics, 18(1):90-99, 1970.

10 pages 15 references article
Descriptors: Historical/Descriptive, Physician Education, Teaching Students, University Psychiatric Policlinic, Lausanne

Key Words:

Communication	Decision Making	Interpersonal Skills
Physician Education	Role Playing	

Points out shortcomings of theoretical and clinical instruction in teaching the doctor-patient relationship, and the advantage of role playing in representing two characteristics of the doctor-patient relationship--irreversibility and decision making. Discusses various psychological dynamics of doctor-patient relationships as brought out in role playing.

32. Tinning, F. C. An Experimental Study Investigating the Effects of Real and Simulated Clinical Training on Psychomotor, Affective and Cognitive Variables During Real Clinical Performance of First Year Osteopathic Medical Students. East Lansing, Michigan: Michigan State University, Department of Counseling, Personnel Services and Educational Psychology, 1973.

397 pages 101 references thesis
Descriptors: Involves empirical study, Physician Education, Teaching Students, Research, Michigan State University, College of Osteopathic Medicine

Key Words:

Actors	Cognitive Skills	Diagnostic Skills
Interpersonal Skills	Neurology	Physician Education
Psychomotor Skills	Research	

Describes empirical study involving osteopathic medical students and comparing simulated and real clinical training in performing a neurological exam. The criteria measures were of cognitive knowledge, psychomotor skill, affective behavior, total clinical performance, patient ratings, and student self-ratings. The results indicated that simulated training provided students with an opportunity to vary behavior, problem solve, and make decisions in an environment that was positive and free of distractions. Critical behaviors were transferred to real clinical settings.

Simulated Patients

33. Tinning, F. C. Simulation in Medical Education. East Lansing, Michigan: Michigan State University, College of Osteopathic Medicine, 1975.

144 pages 74 references monograph
Descriptors: Involves empirical study, Historical/Descriptive, Theoretical/Conceptual, Physician Education, Teaching Students, Evaluating performance of students or others, Research, Michigan State University, College of Osteopathic Medicine, Mereck Foundation

Key Words:

Actors	Costs	Curriculum
Design	Diagnostic Skills	Evaluation
Interpersonal Skills	Neurology	Physician Education
Psychomotor Skills	Reliability	Research

Monograph presents rationale and empirical justification for use of simulated patients in medical education. It begins with a list of individuals currently involved in simulation in medical education (pp. vi-ix). Chapter I is an introduction to educational simulation and presents an overview of the topic. Chapter II discusses three arguments stating the value of simulation to medical education: that simulated patients are more effective for instruction than real patients; that simulated patients can help meet the demands of competency-based education; and that simulated patients are cost-effective. Chapter III, on implementation, gives design principles and an extensive example. Chapter IV gives research applications in using simulated patients in medical education.

34. Twelker, P. A. and Layden, K. Educational Simulation/Gaming. United States International University, Corvallis, Oregon. Issued by ERIC Clearinghouse Media and Technology, Stanford University, Stanford, California, August, 1972.

19 pages 0 references paper
Descriptors: Introductory, General Education, Teaching Students, United States International University, Corvallis, Oregon

Key Words:

Games	Bibliography	Decision Making

Distinguishes between games and simulations and then describes four (4) learning contexts which combine differential features of gaming or simulations (non-simulation games, planning exercises, interpersonal simulation games, large system simulation games). Compares these simulation/gaming categories on various characteristics. Provides an annotated bibliography of basic and in-depth references on simulation/games. Lists organized centers for simulation/gaming and their functions.

Mannequins

1. Arsham, G.M., Colenbrander, August, and Spivey, B.E. "A Prototype for Curriculum Development In Medical Education," Journal of Medical Education, 48:78-84, January, 1973.

   7 pages 7 references article
   Descriptors: Theoretical/Conceptual, Physician Education, Teaching Students, Evaluating performance of students or others, Pacific School of Medical Sciences, San Francisco

   Key Words:
   Curriculum
   Diagnostic Skills
   Ophthalmology
   Teaching
   Development
   Inanimate Models
   Physician Education

   Describes an innovative curriculum in opthalmology incorporating mannequins which allow the simulation of the opthalmoscopic examination. Students in the new course showed significant gains.

2. Colenbrander, A. "Simulation Device for Ophthalmoscopy," American Journal of Ophthalmology, 74(4):738-740, October, 1972.

   3 pages 1 reference article
   Descriptors: Historical/Descriptive, Physician Education, Colenbrander ophthalmology mannequin, Teaching Students, Pacific Medical Center, San Francisco, Hansen Opthalmoscopic Laboratory

   Key Words:
   Audio-visual
   Diagnostic Skills
   Ophthalmology
   Psychomotor Skills
   Development
   Inanimate Models
   Physician Education

   A mannequin has been developed as a teaching device designed to simulate the experience of clinical ophthalmoscopy. It can demonstrate any type of fundus pathology through the use of standard 35 mm slides, and it can also demonstrate corneal, lens, or vitreous opacities, as well as refractive errors. The mannequin can be used for self-instruction as well as in group teaching, and it also has value as a testing tool, permitting standardization of problems.

3. Ford Pitt, T.R. "Teaching Tooth Morphology To Dental Students," British Dental Journal, 137(5):169-72, September 3, 1974.

   4 pages 7 references article
   Descriptors: Historical/Descriptive, Dental Education

4. Gosling, C.G. and Maroon, J.C. "Patient Simulators and Medical Models," Journal of Biocommunications, 1(1):17-22, June, 1974.

4. Gosling (continued)

6 pages 0 references article
Descriptors: Introductory, Physician Education, Nursing Education, Allied Health Education, GYNNY, Breast Examination Simulator, Catheterization Simulator, Lumbar Puncture Simulator, Head Injury Simulator, I.V. Arm, Wrist, Leg; Child Clubfoot Correction, Teaching Students, Indiana University School of Medicine, Department of Neurosurgery, University of Pittsburgh, School of Medicine

Key Words:
Development Inanimate Model

Article stresses that medical artists and educators can inexpensively construct inanimate models to be used as simulators. It describes the materials used to construct simulation models, construction techniques, and financial considerations. It also provides illustrations of various simulations, lists a number of available simulations and materials used to construct simulations.

5. Griffiths, D.A. "A Working Paper Model of the Human Larynx," Medical and Biological Illustration, 21(1):41-47, January, 1970.

7 pages 0 references article
Descriptors: Historical/Descriptive, Anatomy, Teaching Students, Department of Anatomy, College of Medicine, University of Iowa, Iowa City

Key Words:
Anatomy Inanimate Models Development
Teaching Otorhinolaryngology

Describes a simple, inexpensive method of constructing and using paper anatomical models in teaching. An illustration is given of a model of the larynx and surrounding cervical structures.

6. Hars, E. and Hellem, S. "The Use of a Model for Teaching Oral Surgery," The Journal of Oral Surgery, 30:410-412, June, 1972.

3 pages 0 references article
Descriptors: Historical/Descriptive, Dental Education, Teaching Students, University of Bergen, School of Dentistry, Franz Sachs, Melsunger, West Germany

Key Words:
Dental Education Development Inanimate Models
Diagnostic Skills Psychomotor Skills

A model of upper and lower jaws is described for the purpose of teaching dental students oral surgical procedures. Regular oral radiographs can be taken to demonstrate tooth anomalies. Actual real life oral surgical procedures were performed by students on the model simulator, which could be used for other procedures as well.

Mannequins

7. Jones, J. C. "The Acquisition of Dental Skills. An Investigation Into Teaching Mirror Vision," British Dental Journal, 137(5):185-8, September 3, 1974.

   4 pages 6 references article
   Descriptors: Involves empirical study, Dental Education, Crylopax phantom head teeth, Teaching Students, Evaluating performance of students or others, Research

8. McMahon, R. E., Barnhart, G. W. and Olson, R. E. "Skeletal Models As An Adjunct to Jaw Surgery," Journal of Oral Surgery, 31(5):340-347, May, 1973.

   8 pages 4 references article
   Descriptors: Historical/Descriptive, Dental Education, University of Chicago Hospitals and Clinics

   Key Words:
   Continuing Medical Education | Dental Education | Surgery
   Psychomotor Skills | Inanimate Models

   A facial skeletal model of a particular patient can be constructed and used by oral surgeons prior to surgery on that patient. The model aids surgeons to anticipate, plan and practice most appropriate surgical procedures for the patient. It describes the construction of the models, presents 4 case examples of their use, and discusses their advantages and disadvantages.

9. Maroon, J. C. and Gosling, C. "A Head and Neck Trauma Teaching Model," The Journal of Trauma, 13(3):245-247, March, 1973.

   3 pages 0 references article
   Descriptors: Historical/Descriptive, Physician Education, Allied Health Education, Mr. Hurt: A Head and Neck Trauma Teaching Model, Teaching Students, Evaluating performance of students or others, Department of Neurological Surgery, University of Pittsburgh, School of Medicine; Department of Medical Illustration, Indiana University Medical Center, Indianapolis; Medical Plastics Laboratory, Gatesville, Texas

   Key Words:
   Inanimate Models | Psychomotor Skills | Emergency Medicine
   Diagnostic Skills

   Describes a head and neck teaching model that demonstrates fractures, lacerations and corresponding neurological and radiological findings of a severely traumatized patient. Used to stress the importance of the initial examination of a traumatized patient and illustrates significant but subtle diagnostic signs.

10. Russel, K. F. "Ivory Anatomical Manikins," Medical History, 16(2):131-141, April, 1972.

11. Salvendy, G., Goodrich, T. H., Hinton, W. M., Cunningham, P. R. and Ferguson, G. W. "Electromechanical Simulator for Acquisition of Psychomotor Skills in Cavity Preparation," Journal of Dental Education, 37(12):32-40, December, 1973.

9 pages 7 references article
Descriptors: Involves empirical study, Review (summary/criticism), Methodological, Dental Education, Electro-mechanical simulator for cavity preparation, Teaching Students, Evaluating performance of students or others, State University of New York at Buffalo, College of Dentistry, Public Health Service, Division of Dental Health (DH-00225)

Key Words:
Psychomotor Skills | Dental Education | Research
Inanimate Models

A methodological report with statistical substantiation on how the concept of progressive part training coupled with an electro-mechanical dental simulator was used to an advantage in training dental students in Class I cavity preparation in the mandibular right first molar.

The results of the study indicates that utilizing electro-mechanical training simulators yields a significant reduction of training time over traditional training methods.

12. Spivey, B. E. "Mannequin for Practice of Techniques and Procedures," Ophthalmology, 82:487-488, October, 1969.

2 pages 0 references article
Descriptors: Historical/Descriptive, Physician Education, Hansen Ophthalmoscopy Model, Teaching Students, Department of Ophthalmoscopy, University Hospitals, Iowa City, Hansen Ophthalmic Development Laboratory, Iowa City, Ken Hansen, George Korteweg

Key Words:
Ophthalmology | Physician Education | Surgery
Inanimate Models | Psychomotor Skills | Teaching
Diagnostic Skills

Describes ophthalmology mannequin used to practice intraocular surgery and other procedures and techniques on the eye and related areas.

13. Traugott, F. and Shemesh, A. "A Wax Moulage Technique," Medical Biological Illustration, 4(1):31-38, January, 1954.

8 pages 0 references article
Descriptors: Introductory, Historical/Descriptive, Anatomy, Teaching Students, Harvard Medical School, Jersey City Medical Center

Key Words:
Anatomy Inanimate Models

Describes an inexpensive and simple procedure to produce accurate wax models of pathological specimens. Steps of the procedure described in detail include: preserving specimen, forming original mold, forming wax replica, refining model, painting and varnishing and routing model for display.

COMPUTER SIMULATIONS

1. Allen, S. and Otten, M. "The Telephone as a Computer Input-Output Terminal for Medical Information," Journal of the American Medical Association, 208(4):673-679, April 28, 1969.

2. Alpert, D. and Bitzer, D.L. "Advances in Computer-Based Education," Science, 167:1582-1590, March, 1970.

3. Anderson, J. and Tomlinson, R. W. S. "Teaching the Uses of Computers Within the Clinical Course," Proceedings of the Royal Society of Medicine, 67(9):948-950, September, 1974.

   3 pages 1 reference article
   Descriptors: Introductory, Physician Education

   Key Words:
   CAI Curriculum Development

   Discusses the necessary steps of establishing aims, planning a course according to these aims, employing the best teaching methods and facilities, and testing the results when preparing a computer appreciation course for medical students. Objectives are listed.

4. Appleton, D. R. "Interactive Use of Computer Models in Teaching Population Genetics," American Journal of Physical Anthropology, 39(2):267-277, September, 1973.

5. Apter, J. T. "The Analog Computer as a Teaching Aid in Medical Practice and Research," Computers in Biology and Medicine, 1:133-140, 1970.

   8 pages 5 references article
   Descriptors: Involves empirical study, Review (summary/criticism), Teaching Aids in Medical Practice and Research, Teaching students, Research

   Key Words:
   CAI

   CAI can help physicians involved in clinical practice and research to clarify their understanding of the clinical problem. Four problems are described in detail: (1) free fatty-acid conversion to triglycerides in fasting humans, (2) facilitation of ovulation in rats, (3) monitoring of base-excess in dogs, (4) regulation of digitalis dosage in humans. The computer generates solutions to the model equations.

6. Baker, A. B. "Analogs of Respiratory Mechanics," International Anesthesiology Clinics, 9(2):39-64, 1971.

   26 pages 65 references article
   Descriptors: Involves empirical study, Historical/Descriptive, Physician Education

6. Baker, (continued)

Key Words:
Complex System Simulation Physiology
Research

Describes the history and use of analogs of respiratory mechanics. Simple analogs elucidate the properties of the larynx, trachea and bronchae--but physical and mathematical relationships require further developed analogs. Discusses the possibility of compounding a massive electronic analog for respiratory mechanics.

7. Barnett, G. O. "Strategies, Potentials, and Problems of Computerized Assisted Instruction," Physiologist, 16(4):621-5, November, 1973.

5 pages 0 references article
Descriptors: Introductory, Physician Education, Teaching students

Key Words:
Diagnostic Skills

Describes use of computer simulations in medical education. Computer is uniquely suited to simulate physiological or biochemical processes, to simulate patient encounters or to provide diagnostic and treatment guidance. Other educational techniques can not duplicate computer capabilities in these areas. Stresses that computer simulation most helpful to teach difficult problems and objective skills. Discusses advantages of using computer simulation in these situations and problems that must be addressed when adopting computer simulations.

8. Beenen, F., Frankenhuysen, J. H. Van, Veldkamp, J. G. "The Construction of a Descriptive Diagnostic System in Psychiatry: First Experiences with a Computer Simulation," Behavioral Science, 17(3):278-87, May, 1972.

10 pages 26 references article
Descriptors: Involves empirical study

Key Words:
Psychiatry Process Models Evaluation
Research Diagnostic Skills

Describes development and evaluation of computer model to simulate the construction of descriptive diagnostic system in psychiatry. Reasoning processes of psychiatrist engaged in classifying patients were analyzed. Several processes used in classification were programmed. The computer model was tested and showed satisfactory agreement with clinical diagnostic classification. Three experienced psychiatrists rated many of the categories developed by model as clinically meaningful.

9. Bellman, R., Friend, M. B. and Kurland, L. A Simulation of the Initial Psychiatrist Interview. Santa Monica, California: Rand Corporation R-449-RC, December, 1966.

10. Bitzer, M. D. and Boudreauz, C. "Using A Computer To Teach Nursing," Nursing Forum, 8(3):234-254, 1969.

21 pages 4 references article
Descriptors: Involves empirical study, Historical/Descriptive, Nursing Education, Plato III, Teaching Students, Research, Mercy Hospital School of Nursing, Urbana, Illinois, University of Illinois, U. S. Department HEW, Public Health Service (Grant No. NPG 188)

Key Words:

Anatomy	Development,	Research
CAI	Nursing Education	Self-instruction
Cognitive Skills	Ob/Gyn	Utilization
Costs	PMP	

Describes development and use of teaching materials in maternity nursing on PLATO III, a CAI system. Gives extensive description of computer hardware and the logic of the teaching program. Lessons are built upon simulated patient situations and are interactive in nature. The computer terminal consists of a screen and a keyboard. An experimental study comparing computer and lecture teaching methods showed student achievement to be comparable with both methods, but that computer instruction required 1/3 to 1/2 the time. Costs are discussed. PLATO IV, the next version, expected to be operational by 1973, will be less expensive, service more students, and be more flexible.

11. Bleich, H. L. "Computer-Based Consultation," American Journal of Medicine, 53:285-291, September, 1972.

7 pages 20 references article
Descriptors: Historical/Descriptive, Physician Education, Teaching Students, Medical Consultation, Department of Medicine, Harvard Medical School, Beth Israel Hospital, John A. Hartford Foundation (NY)

Key Words:

Physician Education	Management Skills	Hematology
Continuing Education	Diagnostic Skills	Teaching

Describes a computer program that collects and analyzes data on electrolyte and acid-base abnormalities and synthesizes this information into an evaluation note. The program can be used for teaching the management of patients. The user supplies clinical and laboratory data; the computer may request more specific information. An evaluation note may include an explanation of pathophysiology, diagnostic possibilities, general or specific therapeutic recommendations, precautionary measures and suggestions. This program is efficient in terms of time (7 minutes to enter and obtain evaluation) and costs. It describes the program operation and provides sample care and evaluation.

Computer Simulations

12. Bleich, H. L. "The Computer as a Consultant," New England Journal of Medicine, 284(3):141-147, 1971.

7 pages 8 references article
Descriptors: Historical/Descriptive, Physician Education, Consultation

Key Words:
Continuing Education Diagnostic Skills Hemotology
Management Skills

Presents examples of how computers can be used in consultation, specifically to assist the physician in managing patients with electrolyte and acid-base disorders. First, the article briefly compares computer processing capabilities with human information processing. It describes the present program in which the physician interacts with the computer and obtains an evaluation note discussing patient problems. It also describes computer dialogue, evaluation note, benefits and limitations.

13. Bless, S. R. and Rifkind, R. A. "Computer-Assisted Medical Instruction," New York State Journal of Medicine, 73(18):2252-2255, September 15, 1973.

4 pages 4 references article
Descriptors: Historical/Descriptive, All Medical Education, Teaching Students

Key Words:
CAI Diagnostic Skills

Deals with handling the problem of the lack of trained medical personnel by using CAI to make up for the lack of faculty. Mentions the advantages and disadvantages of such instruction and psychological implications to student users. It mainly deals with Diagnostic Skills, particularly: (1) increased store of information and (2) clinical judgment taught through dialogue (Socratic type system) with computer using simulated cases.

14. Bowden, D. H. "Computer-Assisted Instruction in Pathology," Canadian Medical Association Journal, 97:739-742, September 16, 1967.

4 pages 2 references article
Descriptors: Introductory, Historical/Descriptive, Physician Education, University of Manitoba

Key Words:
CAI Pathology

A description of some early and initial attempts at programmed instruction at the University of Manitoba in Pathology. A simple linear (question and answer) dialogue with a computer. A programmed clinicopathological Conference was also developed. Usefullness was cited, but it was to early to tell how far such use will extend.

Computer Simulations

15. Bowden, J. M. "Digital Computer Applications in Pharmacologic Teaching and Research," American Journal of Veterinary Research, 33(3):227-233, January, 1972.

16. Brandt, E. N. "Electronic Computers in Medical Education of the Future," Clinical Anesthesia, 1:125-136, 1966.

    12 pages 19 references article
    Descriptors: Historical/Descriptive, Physician Education, Teaching Students

    Key Words:
    Utilization Decision Making Diagnostic Skills

    Describes the use of computers in medical education in these areas: dissemination of information, individualized instruction, computer simulation of patient and physician-patient encounter, record-keeping, and monitoring of physiological experiments. Briefly, it describes fundamental concepts of computer technology and possible future applications.

17. Brandt, E. N., Jr. "Role of the Computer in Continuing Medical Education," Texas Medicine, 70:43-48, January, 1974.

    6 pages 3 references article
    Descriptors: Introductory, Physician Education, Continuing Education, Teaching Students

    Key Words:
    CAI Self-assessment Diagnostic Skills

    Tracing the problem of continuing medical education for practicing physicians, the article suggests some of the benefits of using CAI. Types of simulation are mentioned with some discussion of computer simulation of patient problems. Educational hueristics and objectives are also included.

18. Briccetti, A. B. and Bleich, H. L. "Computer-Assisted Evaluation of Patients with Hypercalcemia," Clinical Research, 18:452 (abstract), 1970.

    1 page 0 references abstract
    Descriptors: Historical/Descriptive, Physician Education, Computer diagnosis and patient management, Teaching Students, Diagnosing Patient, Harvard University, Beth Israel Hospital

    Key Words:
    Diagnostic Skills CAI

    Description of a computer program for the diagnosis of hypercalcermic. The program is available through teletype terminals which access the telephone system.

Computer Simulations

19. Brigham, C. R. and Kamp, M. "Introduction to Special Issue of Computer-Assisted Instruction in the Health Sciences," Computers in Biology and Medicine, 3(3):183-186, October, 1973.

20. Brigham, C. R. and Kamp, M. "A Selected Bibliography to Computerized Instruction in the Health Sciences," Computers in Biology and Medicine, 3(3):337-342, October, 1973.

6 pages 105 references bibliography
Descriptors: Bibliography, Physician Education, Nursing Education, Dental Education, Allied Health Education, Teaching Students

Key Words:
CAI Dental Education

This is a selected bibliography to computerized introduction in health sciences. Includes references (105), articles on CAI and computer simulations.

21. Brigham, C. and Kamp, M. "The Current Status of Computer-Assisted Instruction in the Health Sciences," Journal of Medical Education, 49:278-279, March, 1974.

2 pages 4 references article
Descriptors: Descriptive, Review (summary), Physician Education, Nursing Education, Dental Education, Allied Health Education, Teaching Students, NLM-Lister Hill, IBM, Digital Equipment Corporation

Key Words:
CAI

A short summary of A Guide to CAI in the Health Sciences, reporting the number of institutions utilizing CAI, major types of programs, languages, etc., as shown by a 1972 survey of 561 schools involved in medical education in the United States and Canada.

22. Bergen, S. S., Jr. "The Computer as a Tool in Medical Instruction," New Jersey Medical Society, 70(4):327, April, 1973.

1 page 0 references article
Descriptors: Introductory, Physician Education, Teaching Students, Rutgers Medical School, Mr. Brigham

Key Words:
CAI

Describes a guide written by Mr. Brigham for those experimenting with computer teaching. It gives a complete listing of computer courses used in the world.

23. Brigham, C. R., Kamp, M. and Cross, K. J. A Guide To Computer-Assisted Instruction in the Health Sciences, LHNCBC-73-01. National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia, Christopher R. Brigham, 1973.

    325 pages 240 references report
    Descriptors: List of Medical Schools Using CAI, Survey, Physician Education, Nursing Education, Dental Education, Allied Health Education, Teaching Students, Evaluating performance of students or others, Research

    Key Words:
    CAI Bibliography

    A listing of health science schools using or interested in CAI: contact persons; computer systems and languages; and courses.

24. Brody, H. A., Lucaccini, L. F., Kamp, M. and Rozen, R. "Computer-Based Simulated Patient for Teaching History-Taking," Journal of Dental Education, 37(8):27-31, August, 1973.

    5 pages 3 references article
    Descriptors: Involves empirical study, Dental Education, Teaching Students, University of California-San Francisco, Medical Center

    Key Words:
    Diagnostic Skills Interpersonal Skills Evaluation

    A computer-based patient simulation exercise was developed to allow dental students to practice interviewing techniques before proceeding to the live patient situation. A rating scale was developed and used to measure history-taking performance of dental students. Students who experienced the computer program performed at a higher level than the control group. The results showed that the computer exercise was an effective means to improve the transition between the didactic and clinical phases of instruction in history-taking.

25. Budkin, A. and Warner, H. R. "Computer-Assisted Teaching of Cardiac Arrhythmias," Computers and Biomedical Research, 2(2):145-150, October, 1968.

    6 pages 2 references article
    Descriptors: Historical/Descriptive, Physician Education, Teaching Students, Department of Biophysics and Bioengineering, University of Utah

    Key Words:
    CAI Self-Instruction Cardiology
    Self-Assessment

    A computer program has been developed to teach cardiac arrhythmias to medical personnel at various levels. The program is self-paced.

25. Budkin (continued)

User is presented an electrocardiogram from a library of arrhythmia cases on oscilloscope, together with related information. The respondent then selects a diagnosis from a list of displayed options and receives feedback on his selection. Specific features of the program and advantages in its use are described.

26. Cassidy, R., et. al. "Computer-Assisted Instruction for Diagnostic Problem Solving of Toothache," Journal of Dental Education, 36(3):46-56, March, 1972.

9 pages 6 references article
Descriptors: Involves empirical study, Historical/Descriptive, Dental Education, Teaching Students, Ohio State University

Key Words:

CAI	Dental Education	Evaluation
Diagnostic Skills	Audio-Visual Teaching	

Describes format and evaluation of a CAI course, ("Tooth") used to teach dental students the diagnoses of a toothache. Twelve case histories of toothache in three major areas were used for instruction or testing: (1) reversible pulpal pain, (2) irreversible pulpal pain, and (3) periodontal pain associated with vital pulps. Sixteen Senior dental students participated in the program. Comparison between pre-test and post-test data indicate that students improved in their ability to gather critical information and in accuracy of diagnosis. CAI courses were equally effective for the student with different scholastic backgrounds.

27. Clark, M. R., Jury, E.I., Krishnan, V. V. and Stark, L. "Computer Simulation of Biological Models Using the Inners Approach," Computers in Biology and Medicine, 5:263-282, 1975.

19 pages 54 references article
Descriptors: Involves empirical study, Historical/Descriptive, Theoretical/Conceptual

Key Words:

Validity	Research	Anatomy
Evaluation	Ophthalmology	Development

Describes the Inners method of using a computer system which is an immediate and inexpensive means of determining the accuracy of a model prior to extensive simulation of a possible faulty model (linearized models). Defines pertinent characteristics of physiological systems (INM) and relates them to roots of the associated characteristic polynomial. Neuromuscular models are discussed (broad variety: hand, eye tracking system, response of eye). The model of the Saccadic Eye movement system can be devised to study aspects of dynamics such as stability, optimality, and aperiodicity.

28. Clark, R. R. "The Impact of a Computerized Peer Review System on Continuing Medical Education," Ohio State Medical Journal, 70(12):748-751, December, 1974.

4 pages 0 references article
Descriptors: Historical/Descriptive, Continuing Education, Medical Advances Institute, OSMA Council and House of Delegates

Key Words:
Evaluation

Evaluation of medical practices and its effects on continuing education. Involves peer review (MAI system). Insight into differences of practices, costs, administration, etc.

29. Coby, K. M. and Enea, H. "Heuristic Methods for Computer Understanding of Natural Language in Context-Restricted On-Line Dialogues," Mathematic Biosciences, 1:1-25, 1967.

25 pages 13 references article
Descriptors: Historical/Descriptive, Physician Education, Teaching Students, Research, Stanford University

Key Words:
Interpersonal Skills Development Psychiatry
Communication Evaluation

Presents heuristic methods for "understanding natural language" through computer simulated psychiatric interviews. Describes the phases (3) of writing an on-line clinical dialogue (innovative as well as denotative meaning). Following this, there is a physical description of facilities (language, statements, decomposition of system, etc.). It then attempts to build a cognitive model of person with whom it is communicating (program).

30. Collart, M. E. "Computer Assisted Instruction and the Teaching-Learning Process," Nursing Outlook, 21(8):527-532, August, 1973.

6 pages 16 references article
Descriptors: Historical/Descriptive, Nursing Education, Teaching Students, Evaluating performance of students or others

Key Words:
CAI Costs
Evaluation

Except for a one paragraph mention of the use of Computer Simulations in Nursing Education, the article deals chiefly with self-paced instructional programs and modular units of study using the computer. Stresses the use of such programs not only in teaching, but in the evaluation of both learner progress and programs (for modification of program). Mention is made of limitations (cost, time, limited access, lack of standardization) and the general acceptance of such programs by learners.

31. Crane, R., Yates, M. and Steen, S. N. "An Improved Electronic Simulator for the Study of the Distribution of Anaesthetic Agents," British Journal of Anaesthesiology, 40:936-942, 1968.

7 pages 6 references article
Descriptors: Historical/Descriptive, Physician Education, Research

Key Words:
Research Anesthesiology

A detailed description of the development of an improved (analogue) model which not only permits the measurement of stored charges on capacitors (gas tensions) without loading but also more faithfully incorporates the physiological mechanisms involved in intrapulmonary gas exchange. Offers a fuller comprehension of the factors governing anesthetic management.

32. Crocco, J. A., Rooney, J. J., Diamond, H. S., Plotz, C. M. and Weiner, M. "A Computer Assisted Instruction Course in the Diagnosis and Treatment of Respiratory Diseases," American Review of Respiratory Disease, 3:299-305, 1975.

7 pages 4 references article
Descriptors: Involves empirical study, Historical/Descriptive, Methodological, Physician Education, Computer-Assisted simulation for clinical decision-making, Teaching Students, Evaluating performance of students or others, Research, State University of New York--Downstate Medical Center, City University of New York, Graduate School, American Lung Association, International Business Machine Corporation

Key Words:
CAI Management Skills Evaluation
Diagnostic Skills

A computer-assisted simulation of the traditional chart method of teaching was developed to be used to provide instruction in clinical decision-making for diagnosis and treatment of pulmonary case studies. Students were required to select the appropriate diagnosis and defend it. Each of the ten simulated cases then required the student/physician to provide the appropriate management while confronting changing problems. Students were given immediate feedback and evaluation of their performance including correction of errors of commission and omission. The basic model was designed to lend itself to adaptation to other subject areas.

33. DeDombal, F. T., Horrocks, J. C., Staniland, J. R. and Gillou, P. J. "Production of Artificial 'Case Histories' by Using a Small Computer," British Medical Journal, 2:578-581, 1971.

33. DeDombal (continued)

4 pages 8 references article
Descriptors: Involves empirical study, Historical/Descriptive, Physician Education, Evaluating performance of students or others, University Department of Surgery, Leeds

Key Words:
Diagnostic Skills Mini-computers
Evaluation Research

Describes the production of artificial case histories on small computers and their use in testing the accuracy of diagnosis, effectiveness and confidence among clinicians, secretaries, technicians and students. Twelve cases of acute abdominal pain were distributed to the group. All groups usually concurred with the intended diagnosis with the clinicians being less confident(may have been concerned with consequences of failure). When errors in diagnosis are harshly penalized, clinicians were infinitely more effective than the other groups.

34. DeDombal, F. T., Hartley, J. R., and Sleeman, D. H., "A Computer-Assisted System for Learning Clinical Diagnosis," Lancet, 1, 145-148, January 18, 1969.

4 pages 0 references article
Descriptors: Historical/Descriptive, Physician Education, Teaching Students, University Department of Surgery, Leeds

Key Words:
CAI Self-instruction
Diagnostic Skills Surgery

Describes the use of the Leeds Computer-Assisted-Learning (CAL) System, a computer controlled method of teaching clinical diagnosis. A question-answer format with print-out is used, and student progress through the program is controlled. The advantage of the system is that it allows practice of diagnostic skills with some built-in controls. The disadvantages are a certain lack of realism, information storage and retrieval problems, and balancing freedom and control.

35. DeDombal, F. T., Hartley, J. R. and Sleeman, D. H. "Teaching Surgical Diagnosis With the Aid of a Computer," British Journal of Surgery, 56(10):754-757, October, 1969.

4 pages 1 reference article
Descriptors: Introductory, Physician Education, Teaching Students, University of Leeds

Key Words:
CAI
Diagnostic Skills

35. DeDombal (continued)

Gives a brief description of the CAL system at the University of Leeds and discusses its use as an aid to conventional methods in teaching diagnostic skills--particularly useful to surgeons. It presents learners with a balance between freedom and control because he can ask what he wishes (develops initiative and judgment).

36. DeLand, E. C. "Validation of Very Large Simulations of Human Biochemistry," Proceedings at the Summer Computer Simulation, San Francisco, July 21-23, 1976. Sponsored by Society for Computer Simulations (formerly SCI). Supported by Grants-in-aid from the Gilmore Foundation and the ORPIC/T.K. White Foundation, and by U.S. Public Health Service Grant No. GM-15320.

37. DeLand, E. C., Winters, R. W., Dell, R. B. and Zuckerman, A. "Fluidmod: A Versatile CAI System for Medical Students," First USA-JAPAN Computer Conference, 1972.

5 pages 8 references article
Descriptors: Historical/Descriptive, Physician Education, Teaching Students, Columbia College of Physicians and Surgeons; John Hopkins University, UCLA, Rand Corporation

Key Words:
CAI Management Skills Physiology
Diagnostic Skills

Description of early model of FLUIDMOD, a computerized simulation of the fluid and electrolyte systems of the body, for use in teaching medical students how to manage fluid and electrolyte balance problems.

38. Diamond, H.S., Weiner, M. and Plotz, C. M. "A Computer-Assisted Instructional Course in Diagnosis and Treatment of the Rheumatic Diseases," Arthritis Rheum, 17(6):1049-1055, November-December, 1974.

7 pages 1 reference article
Descriptors: Historical/Descriptive, Physician Education, Teaching Students, Office of Continuing Education and Department of Medicine, State University of New York--Downstate Medical Center and Graduate School of the City University of New York, The Arthritis Foundation, The Merrill Trust

Key Words:
CAI Diagnostic Skills Management Skills
Continuing Medical Education Family Medicine Self-Instruction

38. Diamond (continued)

Describes use of CAI and the Chart Method of teaching for physicians continuing education. Programs have been developed to instruct physicians on the diagnosis and treatment of rheumatic diseases. Evaluation of performance with immediate feedback and correction of errors, plus savings of time, are advantages of this method.

39. Entwisle, G. and Entwisle, D. R. "The Use of a Digital Computer as a Teaching Machine," Journal of Medical Education, 38(10):803-812, October, 1963.

10 pages 12 references article
Descriptors: Introductory, Historical/Descriptive, Physician Education, Teaching Students, U of Maryland, Johns Hopkins University

Key Words:
CAI Development
Diagnostic Skills

Use of CAI simulations in teaching differential diagnosis. Computer generates a random patient with accompanying symptoms. Students choose most likely disease (from six possible) and interaction ensues. Discusses steps in development of computer program and evaluation of students' responses, labor of preparation and symptom-prevalence matrix modification.

40. Farnsworth, J. "CAMP: Computer and Me: Psychotherapeutically." Journal of Nursing Education, 13(4):26-29, November, 1974.

41. Feurzeig, W., Munter, P. Swets, J. & Breen, M. "Computer-Aided Teaching in Medical Diagnosis." Journal of Medical Education, 39:746-754, August, 1964.

9 pages 2 references article
Descriptors: Historical/Descriptive, Methodological, Physician Education, Teaching Students, Bolt Beranek & Newman, Inc.; 6570th AMRL (BSL), WPAFB, OH 45433, Office of Naval Research, Washington, D.C.

Key Words:
Physician Education Diagnostic Skills
CAI

Describes the use of CAI in diagnosing. Gives some general uses of computer in this area along with some minor drawback, but argues that computers can be used successfully in advanced medical education. The bulk of the article is spent in presenting one of the programs designed to diagnose Pneumococcal Pneumonia. The "Socratic System" was the name of the program.

42. Fiege, H. R., Smith, R. S., Palit, D. and Kruger, E. "An Experimental Anatomy System," Computers in Biomedical Research, 2(4):373-384, June, 1969.

43. Fonkalsrud, E. W., Hammidi, I. B. and Maloney, J. V. "Computer-Assisted Instruction in Undergraduate Surgical Education," Surgery, 62(1):141-147, July, 1967.

    7 pages 5 references article
    Descriptors: Historical/Descriptive, Physician Education, Socratic System, Teaching Students, University of California at Los Angeles, University of California at Irvine

    Key Words:
    Diagnostic Skills CAI Surgery

    First part of the article deals with the Socratic System and its uses in training the Medical Student in problem solving skills (diagnosis, treatment and method of treatment) with surgical patients.

    Second part is a discussion. The first question deals with the loss of doctor/patient interaction (cases must be "hard-date"). A positive point is that students are involved in making decisions (prior to surgery) that they had seen made only by doctors.

44. Forsyth, B. R., Laverty, R. and Hebert, P. "Programmatic Computer Simulation Model for Medical School Planning," Journal of Medical Education, 50:757-764, August, 1975.

45. Frazier, D. T. "Computer-Assisted Self Evaluated Tests for Medical Physiology," Physiologist, 15(4):360-7, November, 1972.

46. Friedman, R. B. "A Computer Program for Simulating the Patient-Physician Encounter," Journal of Medical Education, 48:92-97, January, 1973.

    6 pages 7 references article
    Descriptors: Involves empirical study, Descriptive, Physician Education, Teaching Students, Evaluating performance of students or others, Research University of Wisconsin, National Institutes of Health

    Key Words:
    Decision Making Evaluation Diagnostic Skills

    Description of a computer program for simulating a patient in a hospital setting, and the shortcomings in previous simulations which prompted development of this program. Among the unique capabilities of this program are the patient's changing condition with time, lab and physical results which may change, and the necessity for the student to consider length, cost or availability of tests or procedures. Also included are the results of a short evaluation of the program, utilizing three cases of varying difficulty which were seen by twenty-five physicians from different specialties and varying levels of training.

Computer Simulations

47. Garfinkel, D. "Contributions of Computer Simulation to Clinical Enzymology," Human Pathology, 4(1):79-84, March, 1973.

6 pages 24 references article
Descriptors: Involves empirical study, Historical/Descriptive, Clinical Analysis, Research

Key Words:
Research

Discusses the use of computer simulation in the clinical analysis of enzymes using the GOT-GPT pair of enzymes. Surveys the literature to discuss the arranging of enzymes and building models of appropriate enzymes (discovering optimal set of conditions) to make the model fit the experimental conditions.

48. Gaston, G. W. "Computer Assisted Instruction in Dental Education," Journal of Dental Education, 35:283-288, 1971.

6 pages 6 references article
Descriptors: Historical/Descriptive, Review (summary/criticism), Dental Education, Diagnosis, Teaching Students, Ohio State University, Ohio State Regional Medical Program, Lloyd R. Evans

Key Words:
Self-Instruction CAI Audiovisual
Diagnosis

Deals with description of CAI in Dental Education at Ohio State University. Includes procedures followed by students as well as description of materials (terminal, slides, implements). Includes, also, feasibility study information. The program simulates the interactive sequence leading to a diagnosis. Includes a sample program for diagnosing Pyogenic Granuloma.

49. Goldberg, M., Green, S. B., Moss, M. L., Marbach, C. B. and Garfinkel, D. "Computer-Based Instruction and Diagnosis of Acid-Base, A Systemic Approach," Journal of the American Medical Association, 223(3):269-275, January 15, 1973.

7 pages 13 references article
Descriptors: Historical/Descriptive, Physician Education, University of Pennsylvania

Key Words:
Diagnostic Skills CAI

Computer-based approach for instruction and diagnosis of clinical acid-base disorders. Involves consideration of differential diagnosis list of any given PH list, use of ancillary clinical and lab information about patients, adaptability to users of varied educational backgrounds, provision for tabulating the relative frequencies of acid-base disorders presented. Differential diagnosis based on acid-base map. Sample case included.

50. Grimes, G. M., Rhoades, H. E., Adams, F. C., and Schmidt, R. B., "Identification of Bacteriological Unknowns: A Computer-Based Teaching Program," Journal of Medical Education, 47:289-292, April, 1972.

4 pages 4 references article
Descriptors: Introductory, Historical/Descriptive, Veterinary Medicine, Teaching Students, University of Illinois, College of Veterinary Medicine, HEW (PH PE Grant #00512)

Key Words:
Allied Health Education
CAI
Cognitive Skills
Self-instruction

The college of Veterinary Medicine of the University of Illinois teaches a portion of veterinary bacteriology using a computer-based program entitled "Identification of Bacteriological Unknowns." The program simulates a laboratory in which the student selects a specimen, isolates an organism, and then makes tests necessary to identify it. The program uses color pictures or slides of bacteriological colonies, tests, and stains. The computer stores the student's results and assists him in finding the unknown. By means of this program the student can perform in hours work that would take weeks in a laboratory.

51. Grisell, J. L., Beckett, P. G. S., and Gudobba, R. "Teaching Diagnostic Strategies With A Computer," Journal of Medical Education, 42(3):275, March, 1967.

1 page 0 references abstract
Descriptors: Annotation, Physician Education, Teaching Students, Research, Wayne State University

Key Words:
CAI
Diagnostic Skills
Psychiatry

Annotation of a paper describes use of computer simulation and CAI to teach diagnostic skills to beginning psychiatric residents. Describes the computer program and indicates it can be adapted for use in any medical discipline.

Mentions plans for series of studies: (1) to compare first and third year residents, (2) to compare residents psychoanalytically oriented with those more academic, (3) to use diagnostic cases for didactic material in psychiatry.

Computer Simulations

52. Hagamen, W. D., Linden, D., Leppo, M., Bell, W. and Weber, J. C. "ATS in Exposition," Computers in Biology and Medicine, 3:205-226, 1973.

22 pages 7 references article
Descriptors: Descriptive, Physician Education, Teaching Students, Cornell Medical College, SECOS (Shared Education Computer Systems, Inc.)

Key Words:
CAI Development Self-Instruction

Description of ATS (A Tutorial System) developed at Cornell University College of Medicine. ATS is used to develop and implement computerized tutorial programs able to accept and understand free English student input.

53. Hall, P. and Sebag, J. "Decision-Making in Clinical Practice and Medical Research: A Theoretical Analysis of Predictors, Indicators and Health Index," International Journal of Bio-Medical Computing, 5(4):301-309, October, 1974.

54. Hammond, K. R. "Computer Graphics as an Aid to Learning," Science, 172(3986):903-908, May 28, 1971.

6 pages 16 references article
Descriptors: Involves empirical study, Physician Education, Teaching Students, Evaluating performance of students or others, University of Colorado

Key Words:
CAI Diagnostic Skills Process Models

Deals chiefly with the application of already learned knowledge in judgment situations--Multiple-Cue Probabilities Learning (MCPL). Simulation of diagnostic problems are mentioned. Graphic displays enhance learning by allowing the comparison between pictorial representations of the learner's judgment system with the properties of the task. Speaks to supposed inadequacies of traditional outcome feedback procedures.

55. Harless, W. G. "The Development of a Computer-Assisted Instruction Program in a Medical Center Environment," Journal of Medical Education, 42:139-145, February, 1967.

7 pages 1 reference article
Descriptors: Historical/Descriptive, Physician Education, Teaching Students, University of California at Irvine, University of Oklahoma, Dr. Ralph Gerard, Dr. Thomas Lynn

55. Harless (continued)

Key Words:
CAI

Basically deals with methods of cutting time from preparation of programs through the use of "vocal programming" done at the University of Oklahoma. A sample program is given to demonstrate the developmental process and the roles key individuals might play.

56. Harless, W., Drennon, G., Marxer, J., Root, Wilson, L. and Miller, G. "CASE-A Natural Language Computer Model," Computers in Biology and Medicine, 3:227-246, 1973.

20 pages 2 references article
Descriptors: Historical/Descriptive, Physician Education, Teaching Students, University of Illinois, College of Medicine

Key Words:
CASE Decision Making Diagnostic Skills

Description of the techniques designed into CASE, a computer simulation of the patient encounter, which allows for the understanding and responding to free English inquiry.

57. Harless, W. G., Drennon, G. G., Marxer, J. J., Root, J. A. and Miller, G. E. "CASE: A Computer-Aided Simulation of the Clinical Encounter," Journal of Medical Education, 46:442-448, May, 1971.

6 pages 0 references article
Descriptors: Descriptive, Physician Education, Teaching Students, Evaluating performance of students or others, University of Illinois, College of Medicine

Key Words:
Decision Making Diagnostic Skills

Description of the Computer-Aided Simulation of the Clinical Encounter (CASE) system developed at the University of Illinois College of Medicine, and the semi-automatic patient generating system (GENESYS) used to develop the medical and social histories of new simulated patients for the CASE system.

58. Harless, W., Drennon, G. Marxer, J., Root, J., Wilson, L. and Miller, G. "GENESYS-A Generating System for the CASE Natural Language Model," Computers in Biology and Medicine, 3:247-268, 1973.

58. Harless (continued)

22 pages 2 references article
Descriptors: Descriptive, Physician Education, Teaching Students, University of Illinois College of Medicine

Key Words:
CASE Development

Description of GENESYS, the computer program used in creating the computerized patient simulations of CASE.

59. Harless, W. G., Lucas, N.C., Cutter, J. A., Duncan, R. C., White, J. M. and Brandt, E. N. "Computer Assisted Instruction in Continuing Medical Education," Journal of Medical Education, 44:670-674, 1969.

5 pages 4 references article
Descriptors: Historical Descriptive, Physician Education, University of Oklahoma, Medical Center, Association of American Medical Colleges

Key Words:
CAI Continuing Education Evaluation
Physician Education

Recent developments in computer technology has made it feasible to use CAI for continuing medical education. A CAI tutorial program on emergency resuscitation techniques was included in a week-long continuing education course in clinical anesthesea at the University of Oklahoma Medical Center. Comparing attitudes of the 13 participants before and after the CAI course, there were an increase in the preception of appropriateness and desirability of CAI and educational television and a decrease in simular perceptions toward programmed instruction. Three months later, 9 participants responded to follow-up and rated CAI higher than both educational television and programmed instruction on appropriateness and desirability. Caution is advised in generalizing results from a small sample.

60. Herrick, M. C. "A New Approach to Computer Assisted Instruction in Health Science Education," Alabama Journal of Medical Science, 7(2):172-174, 1970.

61. Hillman, R. G. "The Teaching of Psychotherapy Problems by Computer," Archives of General Psychiatry, 25:324-329, October, 1971.

6 pages 7 references article
Descriptors: Historical/Descriptive, Physician Education, Teaching Students, Department of Psychiatry, Stanford Medical Center, National Institutes of Health (Grant No. RR-00311), ACME Computer Facility, Stanford, Dr. Helena Kraemer, Mrs. Gary Sanders

Key Words:
Communication Interpersonal Skills Physician Education
Process Models Psychiatry

61. Hillman (continued)

Describes a model of computer program (THERAPY) designed to illustrate interview problems in psychotherapy. The therapist assigns a number to his response and his affect. Based on this, the computer selects a patient response using probabilities. Probability, as opposed to branching, is felt to simulate the interview situation more closely. Various "patients" are programed into the computer, an IBM 360/50.

62. Hoffer, E. "Trendiness in the Biomedical Computer Biz," Canadian Medical Association Journal, 110(6):618, March 16, 1974.

63. Hoffer, E. "Experience with the Use of Computer Simulation Models in Medical Education," Computers in Biology and Medicine, 3:269-279, 1973.

11 pages 6 references article
Descriptors: Historical/Descriptive, Physician Education, Massachusetts General Hospital, Teaching Students, Evaluating performance of students or others, Massachusetts General Hospital, NLM-Lister Hill; Rand Corporation, Zuckerman & DeLand; Fenichel

Key Words:

Decision-making	Pharmacology
Hematology	Development

Presentation of the rationale used at MGH for selecting medical problems for building computer simulation models as aids in medical education. Describes computer simulations of anticoagulant drug-clotting factor interactions and management of diabetic ketoacidosis.

64. Hoffer, E. P. "Computer-Aided Instruction in Community Hospital Emergency Departments: A Pilot Project," Journal of Medical Education, 50(1):84-86, January, 1975.

3 pages 8 references article
Descriptors: Introductory, Historical/Descriptive, Physician Education, Teaching Students, Mass. General Hospital; Lister Hill Center of NLM

Key Words:

CAI	Continuing Medical Education
Costs	CPR
Emergency Medicine	PMP
Self-instruction	Utilization

64. Hoffer (continued)

Describes use of computerized simulated patient management cases for continuing education of physicians in five community hospital emergency rooms. Use data for physicians and other health personnel are given. Problems are frequent busy signals and cost. Physician response was generally favorable, and there was some evidence of behavior change attributable to the programs.

65. Hoffer, E. P., Mathewson, H. O., Loughrey, A., and Barnett, G. O. "Use of Computer-Aided Instruction in Graduate Nursing Eudcation: A Controlled Trial," Journal of Emergency Nursing, pp. 27-29, March-April, 1975.

3 pages 9 references article
Descriptors: Involves empirical study, Nursing Education, Teaching Students, Research, Massachusetts General Hospital, Lister Hill Center, NLM

Key Words:

CAI	Cardiology
Cognitive Skills	Continuing Education
CPR	Nursing Education
Research	

Describes a controlled study of the effectiveness of a CAI program in teaching cardiopulmonary resuscitation for registered nurses. Nurses in the CAI group demonstrated significant increases in post-test scores, while control group nurses who received standard instruction did not.

66. Holm, C., Thompson, W., Wilber, M. and Wells, C. "CAISYS-8--A CAI Language Developed for a Minicomputer," Computers in Biology and Medicine, 3:281-291, 1973.

11 pages 1 reference article
Descriptors: Historical/Descriptive, Physician Education

Key Words:
CAI

Minicomputer based CAI system described. Contains new teacher oriented software package called CAISYS-8. Programs are written by teachers not programmers. Emphasis is on language used and process of operation of a program. Mention is made of possible uses for language (including simulation).

67. Hoover, L. W., and Moore, A. N. N. "Dietetic Com-Pak, An Educational Model Simulating Computer-Assisted Dietetics." Journal of the American Dietetic Association, 64(5):500-504, May 1974.

5 pages 8 references article

67. Hoover (continued)

Descriptors: Involves empirical study, Historical/Descriptive, Dietetian Education, "Dietetic Com-Pak", Teaching Students, University of Missouri--Columbia

Key Words:
Allied Health Education | Cognitive Skills | Development
Evaluation | Research

Describes a simulation model (DIETETIC COM-PAK) for teaching dietetians and dietetic students computer-assisted food systems management. Describes design criteria, characteristics of the program, instructional materials, and evaluation of Dietetic Com-Pak.

68. Hubbard, J. P., Levit, E. J., Barnett, G. O., Goldfinger, S. E., Dinnen, J. J., Farquhar, B. B. and Schumacher, C. F. "Computer-Based Evaluation of Clinical Competence," ACEP Bulletin, 11(10):502-505, October, 1970.

4 pages 2 references article
Descriptors: Historical/Descriptive, Physician Education, Evaluating performance of students or others, National Board of Medical Examinees, Massachusetts General Hospital

Key Words:
Evaluation | Medical Education | Certification
Diagnostic Skills

Proposes that a computer based evaluation (CBX) of clinical competence in specialty areas can be developed to overcome limitations of patient management problems (PMP) and oral examinations. Patient problem is simulated on computer and respondent obtains clinical history, formulates differential diagnosis, orders diagnostic studies, formulates final diagnosis and can continue with follow-up procedures. Describes special features of CBX and its limitations.

69. Jelliffe, R. W., Buell, J. and Kalaba, R. "Reduction of Digitalis Toxicity by Computer-Assisted Glycoside Dosage Regimens," Annals of Internal Medicine, 77:891-905, 1972.

15 pages 36 references article
Descriptors: Involves empirical study, Historical/Descriptive

Key Words:
CAI | Internal Medicine | Pharmacology
Physiology

69. Jelliffe (continued)

A time-shared computer program is being used clinically to formulate dosage regimens of distalis leaf, digitoxin, and deslanoside that are (1) quantitatively adjusted to the patient's renal function, body weight, and present computed total body glycoside concentration; (2) adjusted for oral or parenteral administration; (3) capable of replacing any mixture of the above glycosides with any single chosen glycoside so that the peak renal body concentration of all glycosides is kept essentially constant throughout the transition period.

70. Johnson, P. E., Moller, J. H. and Bass, G. M., Jr. "Analysis of Expert Diagnosis of Computer Simulations of Congenital Heart Disease," Journal of Medical Education, 50(5):466-470, May, 1975.

5 pages 8 references article
Descriptors: Historical/Descriptive, Physician Education, Teaching Students, Evaluating performance of students or others, University of Minnesota

Key Words:
Cardiology CAI Diagnostic Skills

Five experts' methods of sequential examination steps are studied to reach a preferred method of examination leading to patient management. Doctors were offered a simulated patient with congenital heart disease and then proceeded through their steps of diagnosis to treatment (in more or less realistic time sequence).

71. Kamp, M. "Evaluating the Operation of Interactive Free-Response Computer Program," Journal of Biomedical Systems, 2:31-44, Winter, 1971.

14 pages 7 references article
Descriptors: Historical/Descriptive, Teaching Students, University of California at San Francisco, Association for the Development of Instructional Systems (ADIS), Physician Education

Key Words:
CAI Development Diagnostic Skills
Evaluation Physician Education

Distinguishes structured and free response computer simulation programs. In a free response program, students can enter questions or responses in their own words and is preferred for certain uses, such as simulated medical history taking. An example of a simulated interview is given. Free response programs are longer, more difficult to write, more expensive, and are slower in response. Describes PILOT, a language adapted to free response programs, and how the language processes student input. Initial testing with students revealed 87% of the computer responses were reasonable and overall student attitude was favorable.

Computer Simulations

72. Kamp, M. and Burnside, M. "Computer-Assisted Learning in Graduate Psychiatric Nursing," Journal of Nursing Education, 13(4):18-25, November, 1974.

8 pages 4 references article
Descriptors: Historical/Descriptive, Nursing Education, PILOT, Teaching Students, University of California at San Francisco

Key Words:

CAI	Communication	Costs
Interpersonal Skills	Nursing Education	Psychiatry
Self Instruction		

Describes use of PILOT, an interactive computer system used to teach certain concepts to graduate students in psychiatric nursing. The programs involve the students interacting with various programmed "patients", including one program that was a midterm exam. Students liked the structuring provided by the programmed patients, and certain characteristic ways of interacting showed up during the computer interviews. Problems were financial, technical, and need for more variety of instructional materials.

73. Kamp, M. and Starkweather, J. "A Return to a Dedicated Machine for Computer-Assisted Instruction," Computers in Biology and Medicine, 3:293-298, 1973.

74. Kirsch, A. D. "A Medical Training Game Using a Computer as a Teaching Aid," Methods of Information in Medicine, 2(4):138-143, 1963.

6 pages 17 references article
Descriptors: Historical/Descriptive, Physician Education, Teaching Students, Datatrol Corporation, Sturlow

Key Words:

Research	CAI	Diagnostic Skills

Describes a computer simulator used to teach diagnosis skills to medical students. Using Monte Carlo probabilities, the programming procedures and game are described in which symptoms are guaranteed a chosen probability, + or - a fixed percentage. Describes how students ask for case histories and lab tests to arrive at a diagnosis. The article also includes a brief report of research findings.

75. Koller, S., Michaelis, J. and Scheidt, E. "Studies on a Diagnostic Simulation Model," Methods of Information in Medicine, 1(4):213-227, 1972.

76. Kowalski, C. J. "Computer-Aided Instruction of Statistics to Dental Students," Journal of Dental Education, 36:68-73, January, 1972.

76. Kowalski (continued)

6 pages 12 references article
Descriptors: Historical/Descriptive, Dental Education, University of Michigan, Brandt, Meskin, Belinski, Walker.

Key Words:
CAI

Description of CONSTAT program at the University of Michigan and its usefulness in the teaching of basic statistical techniques to Dental Master's Candidates.

77. Lefever, R.D. and Johnson, J.K. Association of American Medical Colleges Survey of The Use of Computers in Instruction, Department of Academic Affairs, Bureau of Health Manpower, Department of Health Education and Welfare, Contract No. 231-75-0007. 1975-1976.

173 pages 0 references report
Descriptors: Survey of Medical schools using CAI, Physician Education, Teaching Students, Evaluating performance of students or others, Research,

AAMC Survey of medical schools utilizing computers in instruction.

78. Levine, D. Z. "Computer-Aided Instruction at the Ottawa General Hospital," Canadian Medical Association Journal, 108(4):486-492, February 17, 1973.

4 pages 7 references article
Descriptors: Introductory, Physician Education, Teaching Students, University of Ottawa Medical School, Brigham, Rutgers, Harvard, Dr. H. L. Bleich

Key Words:
CAI Hemotology

A review of experiences using CAI at the University of Ottawa Medical School. Basically the content of the instruction was acid-base and electrolyte programs used by medical students during their senior clerkships in internal medicine. It identified the types of problems encountered when using CAI in a clinical environment such as terminal usage, technical difficulties, and general frustration.

79. Logan, N. S. and Jacobs, R. M. "Continuous-Progress Education. II. Computer Simulation Model of a Flexible Dental Curriculum," Journal of Dental Education, 36(12):27-32, December, 1972.

6 pages 5 references article
Descriptors: Involves empirical study, Theoretical/Conceptual, Dental Education, Utilization of Educational Resources, University of Iowa College of Dentistry, Hill Family Foundation, Public Health Service, Profession Education Improvement Progress

Computer Simulations

80. Lysaught, J. P. and Jason, H. (eds). Self-Instruction in Medical Education. Proceedings of the Second Rochester Conference, June 24-26, 1965. University of Rochester, Rochester Clearinghouse on Self-Instructional Materials for Health Care Facilities, 1967.

252 pages 0 references book
Descriptors: Introductory, Involves empirical study, Historical/Descriptive, Review (summary/criticism), Theoretical/Conceptual, Methodological, Physician Education, Dental Education, Socrates, Teaching Students

Key Words:
Evaluation Diagnostic Skills

Deals basically with evaluation and inputs from medical educators and selected specialists from other fields who analyze the development and use of self-instructional material in medical education (films, tapes, simulators, teaching computers, etc.).

Mentions the general uses of different types of models in Physician and Dental Education with some evaluation and suggestions.

81. Mapleson, W. W. "The Use of Analogs in the Teaching of Pharmacokinetics of the Inhalation Anesthetic Agents," International Anesthesiology Clinics, 9(3):65-97, 1971.

35 pages 29 references article
Descriptors: Historical/Descriptive, General Medical Education, Anesthesiology, Physician Education, Teaching Students, Whelpton

Key Words:
Development Physician Education Process Models
Physiology

82. Mayor, S. J. "The Assay of Medical Student Performance Using a Mini-Computer," Journal of Medical Education, 48(1):100-101, January, 1973.

2 pages 2 references article
Descriptors: Historical/Descriptive, Evaluating performance of students or others

Key Words:
Evaluation

Describes comparison between hand evaluated and mini-computer evaluation of student responses on examinations. Offers 5 reasons why a mini-computer analysis is preferable.

83. McAlister, N. H. "Trendiness in the Biomedical Computer Biz," Canadian Medical Association Journal, 109(12):1195, December 15, 1973.

84. McGown, H. and Faust, G. "Computer-Assisted Instruction in Physican Therapy--A Pilot Program," Physical Therapy, 51(10):1113-1120, October, 1971.

85. McKnown, R. and Barr, L. "Simulation of Excitable Membrane Experiments," Physiologist, 16(4):658-668, November, 1973.

    11 pages 4 references article
    Descriptors: Introductory, Historical/Descriptive, Physician Education, PLATO IV, Teaching Students, University of Illinois

    Key Words:
    CAI Physiology

    Brief description of PLATO IV (Socratic Dialogue) and its use in computer simulation at the University of Illinois, Urbana, to teach excitable membrane experiments. The program allows maximum interaction between students and the Hoglin-Huxley model, allowing students control of clinical and voltage levels and familiarizing advanced students with current experimental design.

86. Mead, C. F. "Guess the Animal," Physiologist, 16(4):674-678, November, 1973.

    5 pages 0 references article
    Descriptors: Historical/Descriptive, General, Digital Equipment Corporation

    Key Words:
    CAI Physiology

    Description of "Guess the Animal" game in which the computer guesses the animal you have in mind and asks you questions. If it can not guess, it then asks pertinent questions and stores your new information for future use.

87. Meyer, J. H. and Beaton, G. R. "An Evaluation of Computer-Assisted Teaching in Physiology," Journal of Medical Education, 49(3): 295-297, March, 1974.

88. Miller, N. C. and Walters, R. F. "Interactive Modeling as a Forcing Function for Research in the Physiology of Human Performance," Simulation, pp. 1-13, January, 1974.

Computer Simulations

89. Nunnery, A. W. "Computer-Assisted Instruction of Medical Students," Southern Medical Journal, 62:1542, December, 1969.

1 page 0 references article
Descriptors: Introductory, Physician Education, University of Oklahoma

Key Words:
CAI

Discusses the use of CAI at the University of Oklahoma and comments from students and instructors.

90. Overstone, J. A. "Computer-Assisted Instruction in Undergraduate and Post-Graduate Medicine," Medical Journal of Australia, 2:487-491, September 10, 1966.

5 pages 0 references article
Descriptors: Introductory, General Medical Education, University of Adelaide

Key Words:
CAI Costs

Gives possible uses of computers in medical education, discussion and description of hardware (system of equipment) and how it might be used (considerations when designing a program). Cost is analyzed for equipment for student use.

91. Partridge, L. D. "Simulation in Biomedical Teaching: Introduction," IEEE Transactions on Biomedical Engineering, 19:78-81, March, 1972.

4 pages 0 references article
Descriptors: Historical/Descriptive, Basic Sciences, Teaching Students, Department of Physiology and Biophysics, University of Tennessee Medical Units

Key Words:
Teaching Physiology Research

Discusses use of simulations in biological sciences. Simulations offer students a chance to develop experience with new and more complex systems. Discusses advantages in terms of cost, time, and isolation of selected complex rules. Provides examples of three "minisimulations" of concepts of neuronal function for neurophysiology students. Experimental studies are necessary to varify concepts derived from simulation.

92. Patton, D. D. "Computer-Assisted Instruction in the Radiological Sciences Using a Desk-Top Computer," Radiology, 100:533-559, 1971.

93. Raeside, D. E. and Traub, S. P. "A Note on a Monte Carlo Approach to Scheduling," Radiology, 110(3):735, March, 1974.

94. Reed, F. C., Collart, M. E. and Ertel, P. Y. "Computer-Assisted Instruction for Continued Learning," American Journal of Nursing, 72(11): 2035-2039, November, 1972.

    5 pages 0 references article
    Descriptors: Introductory, Nursing Education, Teaching Students, Continuing Education, Ohio State University

    Key Words:
    CAI

    Deals with the problems encountered in continuing education for nurses and how CAI can and has been used to help alleviate these problems--pros and cons of CAI, plus brief examples of a program.

95. Rupeiks, I. "Computer-Aided Medical Instruction Using an Interactive Graphics Model of the Normal and Congenitally Defective Heart," IEEE Transaction Biomedical Engineering, 19:88-96, 1972.

    9 pages 16 references article
    Descriptors: Historical/Descriptive, Physician Education, Teaching Students, Research, University of California, School of Dentistry

    Key Words:
    Cardiology

    The on-line interactive-graphics digital computer model of the normal and congenitally defective heart was developed as a basic research and teaching tool. The interactive graphics capability of the simulation system provides the user great flexibility in selecting the types of defects he wishes to study, and in allowing him to progress at his own speed.

96. Saffir, A. J. and Myers, H. M. "A Modern Statistics Course for Dentists Using a Time-Sharing Computer," Journal of Dental Education, 36(4): 26-30, April, 1972.

    5 pages 1 reference article
    Descriptors: Historical Descriptive, Dental Education, University of the Pacific, San Francisco

    Key Words:
    CAI Costs Curriculum
    Evaluation

96. Saffir (continued)

Describes a course for Dental Students using a computer to give practice in problem solving for a course in statistics. The format of the 10 week course was a lecture followed by an open-ended practice session with the computer. The technique is evaluated in the article and found to be effective, inexpensive and time saving.

97. Scheiderman, H. and Muller, R. L. "The Diagnosis Game: A Computer Based Exercise in Clinical Problem Solving," Journal of the American Medical Association, 219(3):333-335, January 17, 1972.

98. Seidel, R. J. "Hardware Technology for Computers in Education: One of the Soluble Problems," Physiologist, 16(4):610-616, November, 1973.

7 pages 5 references article
Descriptors: Historical/Descriptive, General Education, Teaching Students

Key Words:
CAI Computer Simulations Decision Making

Issues to consider when making decisions about computer hardware in education are discussed. Alternative technologies that are available for different user arrangement requirements are considered.

99. Shane, L. L., Marler, E. and Bauman, W. A. "Computer Simulation of Medical Logic in Clinical Decision Support System," New York State Journal of Medicine, 72(12):1636-1644, June 15, 1972.

9 pages 10 references article
Descriptors: Involves empirical study, Historical/Descriptive, Physician Education, Research, IBM, The Presbyterian Hospital, New York City

Key Words:
Diagnostic Skills Process Models Evaluation
Endocrinology

A computer program has been developed to model physicians' pattern of logic in decision making. Describes structure, language and operation of the program. The system was limited to a prototype application for the differential diagnosis of carbohydrate intolerance which users evaluated in depth using case studies from actual clinical setup. Presents examples of the case histories and results of computer analysis.

100. Sivertson, S. E., Hansen, R. H. and Schoeneberger, A. O. "Computerized Test Bank for Clinical Medicine," Educational Technology, 13:38-39, March, 1973.

100. Sivertson (continued)

2 pages 0 references article
Descriptors: Historical/Descriptive, Continuing Education

Key Words:
Diagnostic Skills Evaluation

A test bank of 2,020 questions at the University of Wisconsin was set up for computer assisted test construction. This bank could be drawn upon to construct tests of approximately 125 questions to test diagnostic skills of physicians for the purpose of correcting diagnostic deficiencies. General criteria of questions and clarification systems are briefly described.

101. Slack, W. V., Hicks, G. P., Reed, C. E. and Vancura, L. J. "A Computer-Based Medical History System," New England Journal of Medicine, 214:194-198, January 29, 1966.

5 pages 6 references article
Descriptors: Historical/Descriptive, Theoretical/Conceptual, Methodological, Physician Education, Allied Health Education, Hospital Patient Management, A computer-based medical-history system, Imitation of physician histories, University of Wisconsin, Madison School of Medicine, Massachusetts Institute of Technology, National Institutes of Health (G-104-3)

Key Words:

Management Skills	CASE	Communication
Diagnostic Skills	PMP	Family Practice

Using a small, digital computer (LINC) to obtain clinical histories from allergy patients, a pilot study program was described at the University of Wisconsin--Madison, Allergy Clinic. The questions were presented directly to the patient via a cathode ray series (CRT) to which the patient would answer by pressing appropriate keys on the consule. The questions were structured in a closed log setting which was of the patient's responses. The responses and pertinent data are stored on magnetic tape for analysis and printed in phrase form for clinical use.

The study of fifty patients for allergy histories indicated the computer print-out was superior to the physician-recorded past histories but less detailed when dealing with the present illness of asthma. Patient attitude was positive with expression of interest and approval.

Computer Simulations

102. Smith, L. C. "The Medical Librarian and Computer-Assisted Instruction," Bulletin of the Medical Library Association, 62(1):6-18, January, 1974.

13 pages 40 references article
Descriptors: Introductory, Historical/Descriptive, Physician Education, Nursing Education, Dental Education, Allied Health Education, All Medical Education, CASE, FLUIDMOD, SIM ONE, Teaching Students, Ohio State University, Washington University, University of Illinois, University of California at Los Angeles, Massachusetts General Hospital, Lister-Hill National Center

Key Words:
Diagnostic Skills CAI Evaluation

CAI requirements for hardware, software, communication and personnel are discussed. Solutions are offered in some of the hardware and software problems. The potential role of the librarian in program development, monitoring, and evaluation is considered. It is suggested that CAI may have the additional benefit of encouraging the use of on-line bibliographic retrieval systems.

103. Sokolow, S. and Solberg, W. "Computer-Assisted Instruction in Dental Diagnosis: A Product Development," Journal of Dental Education, 33:349-355, June, 1971.

7 pages 0 references article
Descriptors: Involves empirical study, Historical/Descriptive, Dental Education, Teaching Students, University of California at Los Angeles Dental School

Key Words:
Diagnostic Skills Evaluation Development

Evaluates and discusses the development of CAI in teaching diagnostic skills to dental students. The problem presented was the diagnosis of temporomandibular joint disorders. The main thrust of the article deals with the development of the product (language, determination of entry, and enroute objectives, development of pre and post tests, interactive text, slides and sound, users' manual, administration of program in trail application, revision, etc.). A mock field test is described and findings are offered. Evaluation method presented.

104. Spivey, B. E. "The Computer's Impact in Education," American Academy of Ophthalmology and Otolaryngology, 75:1132-1138, September-October, 1971.

7 pages 15 references article
Descriptors: Introductory, Historical/Descriptive, Physician Education, Sim I, Teaching Students, Ohio State University, University of Illinois

104. Spivey (continued)

Key Words:

Anesthesiology	CAI	Computer Simulations
Curriculum	Self-Instruction	Mannequin

Reviews some principles of education and their application in computer-assisted instruction, as well as the benefits and difficulties of CAI. Gives examples of applications of computer technology in medical education, e.g., patient models, such as PMP's and Sim One, and individualized curriculum, such as that of Ohio State University.

105. Starkweather, J. A. "Computest: A Computer Language for Individualized Testing, Instruction and Interviewing," Psychological Reports, 17: 227-237, 1965.

11 pages 2 references article

Descriptors: Historical/Descriptive, Education in General, Teaching Students, Evaluation performance of students or others, University of California, School of Medicine

Key Words:

Evaluation	CAI

The structure and operation of a computer language is presented, an arrangement which allows machine simulation of individual testing, instruction, and interviewing. Sequences of test questions may be written in natural language and a variety of cues may be used for the recognition of a right answer from typewriter input. Variable comments may be stored which are typed for either a right or wrong answer. Choice of the next question to be asked may be determined by the evaluation of an answer, and scoring is optional for each question. Presented examples demonstrate operation of the IBM 1620.

106. Startweather, J. "Computer-Assisted Learning in Medical Education," Canadian Medical Association Journal, 97:733-738, September 16, 1967.

6 pages 7 references article

Descriptors: Introductory, Physician Education, COMPUTEST, PLATO, COURSEWRITER, ELIZA, Teaching Students, University of Illinois, Bolt, Beranek, and Newman, Inc., Cambridge, Massachusetts

Key Words:

CAI	Diagnostic Skills	Communication
Interpersonal Skills		

106. Starkweather (continued)

Demonstrates and discusses the use of the COMPUTEST System in simulated interviewing situations and diagnostic problems. Emphasis is on the problem of refining questions and language for the program so an "open" interview might be simulated. It also discusses the use of computers for the retrieval of library data and patient records.

107. Starkweather, J. A., Kamp, M. and Monto, A. "Psychiatric Interview Simulation by Computer," Psychiatric Interview Simulation by Computer, 6(1):15-23, 1967.

10 pages 2 references article
Descriptors: Historical/Descriptive, Counseling, Interviewing, U.S. Public Health Service

Key Words:
Communication Development Psychiatry
Interpersonal Skills

Describes a programming language, COMPUTEST, and its uses in simulating both interviewer and patient behavior in the context of an initial psychiatric interview. Five sample interviews are given. Some uses of simulated interviews are for training and for testing theories of interviewing.

108. Swets, J. A. and Feurzeig, W. "Computer-Aided Instruction," Science, 150:572-576, October, 1965.

5 pages 7 references article
Descriptors: Historical/Descriptive, Physician Education, Socratic System, Teaching Students, Harvard Health Center, Judith R. Harris, Preston K. Munter

Key Words:
CAI Diagnostic Skills

Using the example of diagnosing pneumococcal pneumonia, a program from the Socratic system is presented for the purpose of demonstrating how clinical problem-solving can be taught through computer simulation. The system was designed for students who might be hampered by an inability to demonstrate initiative under a relatively restricted procedure.

Mentions three alternative programs and lists references.

109. Taylor, W. C., Grace, M., Taylor, T. R., Fincham, S. M. and Skakun, E. N. "The Use of Computerized Patient Management Problems in a Certifying Examination," Medical Education, 10:1-4, 1976.

109. Taylor (continued)

4 pages 10 references article
Descriptors: Historical/Descriptive, Physician Education, Evaluating performance of students or others, Royal College of Physicians and Surgeons, Canada

Key Words:
Certification | Costs | Physician Education
Evaluation | Pediatrics | PMP

Describes use of computerized patient management problems (CPMP) in addition to multiple choice questions and oral examination for certification of pediatricians in Canada. The advantages of CPMP's are greater objectivity and saving of examiner time; they can also be written in both French and English. A general description of the four CPMP's used and the establishment of norms is given. Also, data from the first administration to 160 candidates is described.

110. Tennyson, R. D. "Applications of Computers in Education," Physiologist, 16(4):600-608, November, 1973.

9 pages 7 references article
Descriptors: Introductory, General Education, Computer, PLATO, TICCET, Teaching Students, Evaluating performance of students or others, Counseling Students, Florida State University, University of Illinois, IBM

Key Words:
CAI

The article generally deals with the possible uses of computer in an educational setting. The main areas considered were a) CMI(Computer Managed Instruction), b) CAI, c) learning simulations.

Cost effectiveness was dealt with as well as induced instructional support, testing, information retreival, counseling and the advantages and disadvantages of computer simulation.

111. Thompson, D. M. "Computer Training of Medical Students in Statistical Analysis. II Comparison of Standard Errors of the Means of Data From Small and Large Classes." Journal of American Osteopathic Association, 73(5):413-414, January, 1974.

2 pages 0 references article
Descriptors: Involves empirical study, Physician Education

Key Words:
CAI Research

111. Thompson (continued)

Involves the use of computers in the training of Medical students in statistical analysis. The comparison of standard errors of the means of data from small and large classes is discussed.

112. Swain, R., Lynn, W., Hodgson, T., Becker, N. and Johnson, K. "Epidemic Simulation for Training in Public Health Management," IEEE Transactions on Biomedical Engineering, 19(2):120-125, March, 1972.

6 pages 2 references article
Descriptors: Historical/Descriptive, Public Health Personnel, Measles, Flu, Physician Education, Teaching Students, Center for Environmental Quality Management, Cornell University, Division of Environmental Health Sciences (NIH Grant No. ES-00130)

Key Words:

Allied Health Education	Decision Making	Development
Management Skills	Physician Education	Public Health

Describes epidemiological computer simulations to augment the teaching of epidemiology to medical students and others concerned with public health and the control of epidemics. Interactive simulations are used to expose students to realistic epidemic situations and permit them to experiment with various control strategies. Criteria by which simulation for such teaching purposes may be evaluated are proposed and two simulations, MEASLES and INFLU, are described in detail. Information about user experience is given.

113. Tidball, C. S. "MEDLEARN: An Orientation to MEDLINE," Physiologist, 16(4):669-673, November, 1973.

114. Tidball, C. S. "Challenges of CAE Development. Introductory Remarks," Physiologist, 16(4):608-610, November, 1973.

3 pages 0 references article
Descriptors: Series of lectures, Washington University

Key Words:
CAI

Introductory remarks to a teaching session on the choice of hardware for CAE.

115. Tobias, S. "Distraction, Response Mode, Anxiety and Achievement in Computer-Assisted Instruction," Journal of Educational Psychology, 65(2):233-237, October, 1973.

Computer Simulations

116. Trzebiatowski, G. L., Ferguson, I. C. "Computer Technology in Medical Education," Medical Progress Through Technology, 1(4):178-186, February, 1973.

9 pages 19 references article
Descriptors: Introductory, Physician Education, CASE, GENESYS, SIM ONE, Teaching Students, Harvard University, Ohio State University, University of California at Davis, University of Southern California, University of Illinois, Dr. William Harless

Key Words:
CAI Computer Simulations CASE
Diagnostic Skills

The article discusses the social pressure to improve medical education and services. It goes on to suggest the uses of computers in that process (as tutor, patient and doctor). Hints are given on how to save outline time in production of programs. Patient simulation by computer is dealt with, mainly for diagnostic purposes. Different types of simulations (CASE, GENESYS, SIM-ONE) are briefly described and evaluated.

117. Van De Walle, E. and Knodel, J. "Teaching Population Dynamics With a Simulation Exercise," Demography, 7(4):433-448, November, 1970.

16 pages 11 references article
Descriptors: Historical/Descriptive, Introduction to Demography, Course on Population, Teaching Students, Office of Population Research, Princeton University

Key Words:
Demography

Computer simulation used to teach undergraduate and introductory graduate student population dynamics is described. Program presents problems pertaining to formation and evolution of population trends by mortality and fertility rates. Discusses integration of simulation into course, limitations of present programs, and presents descriptions of sample exercises with illustrations of how a computer simulates population.

118. Wakefield, J. S. "Review of Two Years Experience with CAI," Computer Medicine, 1(9):9-10, September, 1971.

119. Warner, H. R. "A Link Trainer for the Coronary-Care Unit," Computers in Biomedical Research, 2(2):135-144, October, 1968.

10 pages 14 references article
Descriptors: Historical/Descriptive, Nursing Education, "Link Trainer," Teaching Students, Latter Day Saints Hospital, Salt Lake City, National Institutes of Health (Grant No. 2-T1-5463)

119. Warner (continued)

Key Words:

Continuing Medical Education	CAI	Cardiology
Diagnostic Skills	Nursing Education	Management Skills

Describes computer simulation programs to teach nurses to diagnose and institute emergency treatment for cardiac abnormalities most often seen in coronary care units. The program is connected to 19 sites in 5 hospitals, and displays 14 arrhythmias plus noise. The nurse is offered courses of action from which to choose. The EKG reading changes over time if the nurse delays. Examples are given of how the programs work.

120. Weber, J. C. and Hagamen, W. D. "ATS--A New System for Computer-Mediated Tutorials in Medical Education," Journal of Medical Education, 47: 637-644, 1972.

121. Weinberg, A. "CAI at the Ohio State University College of Medicine (1973)," Computers in Biology and Medicine, 3:299-305, 1973.

7 pages 2 references article

Descriptors: Historical/Descriptive, Allied Health Education, Physician Education, Nursing Education, Dental Education, CASE, Massachusetts General Hospital, Teaching Students, Evaluating performance of students or others, Ohio State University, University of Illinois, Washington Medical School, Fort Worth Osteopathic Hospital, Lister Hill-National Library of Medicine, Bureau of Health Manpower Education, Bolt, Baranek and Newman, Inc.

Key Words:

CAI	Computer Simulations	Development
Self-Instruction	Continuing Medical Education	

Description of organization and activities related to CAI efforts at Ohio State University, College of Medicine. Typical production methodology is discussed as it relates to the various developmental and continuing applications of CAI. On-going CAI projects in medical, nursing and allied health curricula, the use of CAI in independent study, and the use of CAI in continuing health professional education are discussed.

122. Wells, C. H., Thompson, W. M. and Holm, C. S. "Instruction in Renal Physiology on a Minicomputer-Based Educational System," Physiologist, 16(4):678-683, November, 1973.

123. Williams, T. E., Jr., Beran, R. L., Folk, R. L., Prior, J. A. and Zollinger, R. M. "The Ohio State University Pilot Medical School," Surgery, 70:47-52, July, 1971.

124. Wilson, A. M. "The Use of Analogs in Teaching," International Anesthesiology Clinics, 9(2):1-37, 1971.

37 pages 3 references article
Descriptors: Historical/Descriptive, Physician Education, Sim One, Resusci-Anne, Infant Intubation Model, Teaching Students

Key Words:
CPR Teaching Anesthesiology

Describes many forms of analogs, advantages, and their uses in different situations. Discusses simulation as one type of full-sized analog and provides examples of simulations useful in the field of anesthesiology: Sim One, Resusci-Anne, and an Infant Intubation Model.

125. Woodrow, K. M. "Computer Education for Physicians: A Computer Service in an Internship Program," Journal of Medical Education, 45:531, 1970.

4 pages 1 reference article
Descriptors: Introductory, Historical/Descriptive, Physician Education, Intern Training, Computer Education, Teaching Students, Kaiser Foundation Hospital, International Business Machine Corp., (IBM), American Medical Association, Division of Medical Education, Morris F. Collen, Martin A. Shearn

Key Words:
CAI Management Skills Curriculum
Interpersonal Skills Mini-Computers

The increasing use of computer assistance in a clinical setting has encouraged the development of a computer service as an elective portion of a rotating internship at the Kaiser Foundation Hospital, Oakland, California. Class participants receive training in principles, facts, and procedures relating to current and projected medical applications of electronic data processing techniques.

126. Woods, S. M. "A Computerized Self-Assessment Examination for Residents," American Journal of Psychiatry, 131(11):1283-1286, November, 1974.

4 pages 11 references article
Descriptors: Historical/Descriptive, Physician Education, Teaching Students, Evaluating performance of students or others, Department of Psychiatry, University of Southern California, School of Medicine

Key Words:
Psychiatry CAI Evaluation
Self-Assessment

126. Woods (continued)

Portions of the American Psychiatric Association's Psychiatric knowledge and skills self-assessment program (PKSAP-II) were administered to psychiatric residents via computer response apparatus. The system provides immediate feedback to respondents on each question and upon completion of total test, printout provides respondents individual scores and comparison to group scores.

Reactions to the testing program were mixed. Respondents were generally favorable to the immediate feedback, but reported unfavorable attitudes toward fixed time intervals imposed on a survey. Suggests that computerized testing procedures can be used to facilitate and motivate learning and to evaluate instructional programs.

127. Wooster, H. "The Lister Hill Experiment CAI Network--A Progress Report," Physiologist, 16(4):626-635, November, 1973.

12 pages 1 reference article
Descriptors: Historical/Descriptive, Allied Health Education, Physician Education, Nursing Education, CRIB, CASE, Teaching Students, Ohio State University, University of Illinois, Massachusetts General Hospital, National Library of Medicine (Lister Hill National Center for Biomedical Communications)

Key Words:

Audiovisual	CAI	CASE
Costs	Development	Evaluation
Physician Education	Utilization	

Reviews the progress of the Lister Hill CAI Network begun in 1971. It briefly describes programs written at each of the three initial institutions, Massachusetts General Hospital, Ohio State University, and the University of Illinois, the hours of usage, and the spread of the system.

128. Wooster, H. and Lewis, J. "Distribution of Computer-Assisted Instructional Materials in Biomedicine Through the Lister Hill Center Experimental Network," Computers in Biology and Medicine, 3:319-323, 1973.

5 pages 3 references article
Descriptors: Historical/Descriptive, Physician Education, Nursing Education, Dental Education, Allied Health Education, CASE, Simulations, Massachusetts General Hospital, Teaching Students, Evaluating performance of students or others, Research, University of Illinois Medical Center, Ohio State University, National Library of Medicine-Lister Hill

Computer Simulations

128. Wooster (continued)

Key Words:
Evaluation CAI

Description of the organization of the Lister Hill Experimental CAI Network, as of early 1973. Issues concerning the distribution and utilization of CAI materials are discussed with respect to this project.

1. Abrahamson, S. "Utilization of Current Knowledge of the Educational Process," Journal of Medical Education, 45(11): Part II, 101-108, November, 1970.

   7 pages 8 references article
   Descriptors: Historical/Descriptive, Physician Education, Sim I, Simulated Patients, Teaching Students, Evaluating performance of students or others, Division of Research in Medical Education, University of Southern California School of Medicine, Lee S. Shulman

   Key Words:

Utilization	Teaching	Simulated Patients
Computer Simulation	Curriculum	Mannequins

   Discusses principles of learning described in Dr. Lee S. Shulman's earlier paper and their actual use in medical schools as of 1970. Principles discussed are: transfer, diagnostic testing, simulation, motivation, and video analyzed instruction. Mentions how each could be used and describes how they are, or more likely are not, applied in teaching in medical schools.

   Concludes by stating 3 needs that must be met to bring about change in medical education: (1) systematic planning and evaluation of change, (2) innovative ideas and climate for innovation, and (3) moral, administrative, and financial support.

2. Abrahamson, S., Denson, J. S. and Wolf, R. W. "The Effectiveness of a Simulator in Training Anesthesiology Residents," Journal of Medical Education, 44:515-519, 1969.

   5 pages 0 references article
   Descriptors: Involves empirical study, Physician Education, Sim I, Research, University of Southern California, Department of Health, Education and Welfare

   Key Words:

Anesthesiology	Computer Simulations	Diagnostic Skills
Physician Education	Psychomotor Skills	Research
Mannequin		

   The educational potential of a computer-controlled patient simulator was tested by the University of Southern California School of Medicine. The results of the experiment suggests unequivocally that there is a two-fold advantage to the use of such a simulator in training anesthesiology residents in the skill of endotracheal intubation: (a) residents achieve proficiency levels in a smaller number of elapsed days of training, thus effecting a savings of time in the training of personnel, and (b) residents achieve a proficiency level in a smaller number of trials in the operating room, thus posing significantly less of a threat to the patients' safety. The small number of subjects in the study and the large within-group variability were responsible for a lack of statistical significance in 4 of the 6 analyses performed; however, all differences were substantial and in the hypothesized direction.

3. Barrows, H.S. and Mitchell, D.L.M. "An Innovative Course in Undergraduate Neuroscience: Experiment in Problem Based Learning With 'Problem Boxes,'" British Journal of Medical Education, 9:223-230, 1975.

8 pages 10 references article
Descriptors: Historical/Descriptive, Physician Education, "Problem Boxes" (Barrows), Teaching Students, McMaster University Medical Center

Key Words:

Diagnostic Skills	Physician Education	Teaching
Neurology	Management Skills	Simulations
Communication	Curriculum	

Reports the organization and evaluation of an undergraduate course in neurology at McMaster in which problem boxes are the basic learning resource. The course uses small tutorial groups with 5 students and 1 faculty member who together plan and engage in self-directed study and evaluation. Goals of problem boxes are to develop problem solving skills and self-directed learning skills in context of neurosciences. Problem boxes present a practical clinical problem as in a clinical situation and students provide responses. As a case unfolds, a student can compare his responses to clinicians. A variety of media, simulated patients and faculty resources are available for further consultation. Evaluation of course indicates that students initially had difficulties in structuring their learning experiences in the small group setting. As they became more experienced in solving problems, they felt they were learning problem solving skills, were more motivated, and were learning neurosciences.

4. Beck, I. Some Dimensions of Simulation. Expanded for presentation at the Symposium on Simulation, American Educational Research Association by Bruce Monroe & INSGROUP, INC. Orange, California, February 1969.

9 pages 28 references paper
Descriptors: Historical/Descriptive, General Education, Teaching Students

Key Words:

Computer Simulations	Costs	Curriculum
Decision Making	Development	Evaluation
Games	Research	

Gives various definitions of simulation and four characteristics of simulation: analogous situation, low risk input, symbolic output and replicability. Distinguishes role playing, games, and simulation, and discusses six dimensions of simulation games: reality/fidelity, complexity of decisions, curriculum aspects, source or model,

replicability, and evaluation. Comments upon computer-based games and research on games. Discusses advantages over lecture-discussion and direct experience, and the disadvantages of design problems and cost. Concludes with a glossary and a selected bibliography.

5. Beck, I. H. and Monroe, S. "Some Dimensions of Simulation," Educational Technology, 9(10):45-49, 1969.

5 pages 24 references article
Descriptors: Historical/Descriptive, General Education, Instructional Systems Group, Inc., Seal Beach, California

Key Words:

CAI	Computer Simulations	Decision Making
Development	Games	

Describes the following aspects of simulation as an educational technique: (1) definition; (2) characteristics, including analog simulations, low risk input, symbolic feedback, and replicability; (3) distinction between role playing, games, and simulation; (4) six dimensions of simulation games, including reality, complexity, curriculum content, model design, replicability, and evaluation; (5) computer based simulation games; (6) research on simulation games; (7) advantages; and (8) disadvantages.

6. Boocock, S. and Schild, E. Simulation Games in Learning. Beverly Hills, California: Sage Publications, Inc., 1968.

279 pages 124 references book
Descriptors: Introductory, Historical/Descriptive, Theoretical/Conceptual, General Education, Business, Teaching Students, John Hopkins, University of Michigan, Harvard, Gunn Senior High, Palo Alto, California, Carnegie Tech., Harvard Business School, Northwestern University International Program, Project Simile

Key Words:

Cognitive Skills	Decision Making	Computer Simulations
Teaching	Games	Role Playing
Audiovisual	Development	Research

A collection of articles on gaming and simulating as teaching devices including the rationale, the impact, the parameters, and the perspectives for the future.

7. DeDombal, F. T., Horrocks, J. C., Staniland, J. R. and Gill, P. W. "Simulation of Clinical Diagnosis--A Comparative Study," British Medical Journal," 2:575-577, 1971.

3 pages 7 references article
Descriptors: Involves emprical study, Physician Education, Minisim, Teaching Students, University Department of Surgery, Leeds

Key Words:

Computer Simulations	Evaluation	Teaching
Diagnostic Skills	Written Simulations	

Compares use of simulation modes on clinicians' diagnostic performance and preference for the modes. Clinical case studies of varying difficulty were developed in 3 modes: (1) computer, (2) "Minisim" board problem cards, (3) verbal modes-information presented in response to verbal questions. Approximately 15 clinicians worked through 6 cases in each mode. The verbal mode was preferred in terms of its realism and enjoyment. Using the "Minisim" board, clinicians selected more information than he would in raal life. On computer simulations, the clinician rigidly asked the same questions in the same sequence regardless of the presentation of different problems. Computer was least preferred in terms of realism and enjoyment. Accuracy of diagnostic judgment was not significantly different although computer cases had slightly lower percentage of correct diagnosis. Discusses advantages and disadvantages of the different modes.

8. Farquhar, J. A., Bretz, R., Ginsberg, A. S., Lincoln, T. L., Mellone R. J. and Mills, G. F. Applications of Advanced Technology to Undergraduate Medical Education. Santa Monica, California: The Rand Corp., 1970.

81 pages 2 references booklet
Descriptors: Theoretical/Conceptual, Physician Education, "Clinical Encounter Simulator," "Patient Management Decision Aid," Teaching Students, Evaluating performance of students or others, Research, National Library of Medicine, Rand Corporation

Key Words:

Audio-Video	Simulation Laboratory	CAI
Computer Simulations	Decision Making	Diagnostic Skills
Development	Evaluation	Physician Education
Self Assessment	Self Instruction	

Describes how advanced technology can affect quantity and quality of medical school graduates. Applications discussed were: computer-assisted instruction and self-evaluation, ultra-microfiche retrieval and display system, electronic video recording, multimedia aids called "Clinical Encounter Simulator" and "Patient Management Decision Aid." Other topics discussed: goals of applying technology to medical education,

8. Farquhar (continued)

questions to be answered before widespread implementation of systems, possible directions for future research, examples of the form and possible results of such research, examples of cost calculations in implementing systems. This study was prepared for the National Library of Medicine by the Rand Corporation.

9. Gage, N. L. (ed). The Psychology of Teaching Methods. The Seventy-fifth Yearbook of the National Society for the Study of Education Part I. Chapter VII, "Teaching With Simulation and Games," by Constance J. Seidner. Distributed by the University of Chicago Press: Chicago, Illinois, 1976.

36 pages 133 references book
Descriptors: Review (summary/criticism), Theoretical/Conceptual, General Education, Teaching Students

Key Words:

CAI	Cognitive Skills	Curriculum
Games	Interpersonal Skills	Research
Psychomotor Skills	Role Playing	Teaching

Reviews following areas related to simulations and games: socialization, fuction of play, types, relationship to other teaching techniques, learning, goals, effectiveness, correlates of effectiveness, research issues, and role of the teacher.

10. Gordon, M. S. "Cardiology Patient Simulator," American Journal of Cardiology, 34:350-355, September, 1974.

7 pages 10 references article
Descriptors: Historical/Descriptors, Physician Education, HARVEY, Teaching Students, Evaluating performance of students or others, School of Medicine, University of Miami, Darrell G. Patterson

Key Words:

Cardiology	Teaching	Development
Evaluation	Diagostic Skills	Psychomotor Skills

An animated mankin simulating 50 cardiovascular disease states has been developed. The animated manikin and its teaching aids, with emphasis on patient simulation, can help meet two major needs: (1) to produce more and better trained physicians in less time and at less cost, and (2) to provide an objective method to measure the clinical competency of physician-students in patient-oriented examinations. Prototype will be evaluated at 5 institutions: Mayo Clinic, Duke University, Georgetown University, Emory University, and University of Miami (Florida).

Article documents construction, snythesis, evaluation and possible computerization of simulators. Advantages and pitfalls of using this simulator are discussed.

11. Hoffman, K. I. and Abrahamson, S. The Effectiveness of the Use of a Simulator in Training for Certain Health-Care Tasks. Proceedings of the Thirteenth Annual Conference in Medical Education, Sponsored by the Association of American Medical Colleges, Division of Educational Measurement and Research in Conjunction with the 85th Annual Meeting, November, 1974.

8 pages 0 references paper
Descriptors: Involves empirical study, Historical/Descriptive, Physician Education, Nursing Education, Allied Health Education, SIM I, Teaching Students, Evaluating performance of students or others, Research, University of Southern California, Bureau of Health Services Research and Evaluation of Health Education and Welfare (Grant No. HS 00020)

Key Words:

Anesthesiology	Cognitive Skills	Costs
Endoscopes	Evaluation	Mannequin
Research		

Investigates cost-effectiveness of SIM I (a manikin) as a training tool for learning six tasks using criteria of: (1) learning per unit of time, (2) savings of faculty time, and (3) saving of student time in learning. The subjects were students of various health professions--medicine, nursing, and allied health. The six tasks were respirator application, endotracheal intubation, intramuscular injection, recovery room care, pulse and respiration measurement, and induction of anesthesia. Training on SIM I was compared with a variety of other teaching methods for each of the six tasks. An overview of findings is presented. The general conclusion is that SIM I is cost-effective.

12. Jason, H., Kagan, N., Werner, A., Elstein, A. and Thomas, J. "New Approaches to Teaching Basic Interview Skills to Medical Students," American Journal of Psychiatry, 127(10):140-143, April, 1971.

4 pages 10 references paper
Descriptors: Introductory, Historical/Descriptive, Physician Education, Teaching Students, College of Human Medicine, Michigan State University

Key Words:

Interpersonal Skills	Diagnostic Skills	Simulated Patients

A teaching program for first year medical students that uses videotape and simulated patients to achieve basic interview skills is described. Simulated patients are actors and acresses and housewives. They were trained for 4 to 5 hours before an interview. Each student interview (15 minutes) was videotaped and played back and discussed. Each student did 5 interviews.

Multi-Media Simulations

13. Kagan, N. "Can Technology Help Us Toward Reliability in Influencing Human Interaction?" Educational Technology, pgs. 44-51, February, 1973.

8 pages 24 references article
Descriptors: Historical/Descriptive, Physician Education, Counselor Education, Interpersonal Process Recall, Teaching Students, Michigan State University

Key Words:
Interpersonal Skills Videotape

Interpersonal process recall (IPR) is a program to teach professionals (teachers, counselors, physicians) to become more effective in interpersonal relations. Participants' interactions are videotaped and played back to participants. During replay a trained "inquirer" helps the participants recall their feelings and learn by discovery the affective components of the videotaped interaction.

The IPR program is packaged into 6 units which are discribed in detail in this article. Empirical studies of effectiveness of IPR in different settings are reported. Author indicates that IPR can be used reliably to influence mental health goals in a variety of settings.

14. Kagan, N. I. "Teaching Interpersonal Relations for the Practice of Medicine," Lakartidningen, 71(47):4758-4760, November 20, 1974.

3 pages 10 references article
Descriptors: Historical/Descriptive, Physician Education, Interpersonal Process Recall, Teaching Students, Michigan State University

Key Words:

Actors	Audiovisual	Communication
Interpersonal Skills	Nonverbal Communication	Physician Education
Simulated Patients	Videotape	

Describes Interpersonal Process Recall (IPR), a method of teaching courses in the doctor-patient relationship. The course is a series of discrete developmental tasks that provide experience in interaction and counseling. The course requires approximately 40 hours, divided between large group instruction of 20-30 students and individual or small group labs. Film simulations, videotape playback, and peer supervision are the methods used.

15. Kagan, N. and Schauble, P. G. "Affect Simulation in Interpersonal Process Recall," Journal of Counseling Psychology, 16(4):309-313, 1969.

5 pages 3 references article
Descriptors: Historical/Descriptive, Clients of counseling, Interpersonal Process Recall, Teaching students or others, College of Education, Michigan State University

15. Kagan (continued)

Key Words:

Interpersonal Skills Actors Videotape

Describes techniques used to confront counseling clients with their own reactions to emotional stimuli. Technique has developed from Interpersonal Process Recall research at Michigan State University. Actors simulate affective films which encourage them to respond as they would in interpersonal relations. Both client and films are videotaped simultaneously. Videotape is played back to client and trained counselors help the client examine his reaction to the films. Physiological reaction may also be recorded and played back. Describes client reaction to playback and 4 criteria which could be used to judge client growth.

16. Kagan, N., Schauble, P., Resnikoff, A., Danish, S. and Krathwohl, D. "Interpersonal Process Recall," The Journal of Nervous and Mental Disease, 148(4):365-374, 1969.

10 pages 7 references article
Descriptors: Introductory, Historical/Descriptive, Counseling, Interpersonal Process Recall, Michigan State University

Key Words:
Interpersonal Skills Videotape

Describes the interpersonal process recall (IPR) method which uses stimulated recall of videotaped interactions to facilitate therapy and counselor training. Recall sessions are conducted by a clinical "interrogator" who helps the client examine the underlying dynamics of his interaction with the counselor. The development, role and training of this "interrogator" are described.

The value of the IPR method in accelerating client progress in counseling and basic considerations in regard to its application are discussed.

17. Knapp, C. F. "A Childbirth Simulator for Training Students in Maternity Patient Care," Proceedings of the San Diego Biomedical Symposium, 1972. San Diego, California: 11:121-124, February 2-4, 1972.

4 pages 2 references paper
Descriptors: Historical/Descriptive, Nursing Education, Childbirth Manikin (HERA), Teaching Students, College of Nursing and Biomedical Engineering Department, University of Kentucky, Lexington, Public Health Service Grant No. 5D10 NU 00365-03

Key Words:
Development Mannequins Ob/Gyn
Psychomotor Skills

Describes development and use of dynamic simulator to teach maternity

care to nursing students. Life-size manikin includes pelvis, vaginal canal, uterus, placenta, umbilical cord, and fetus with heart sounds. Programmable electropneumatic system controls uterine contractions and position, rupture of membranes, expulsion of fetus and fetal heart rate during labor and delivery. Materials selected to represent reality. Audio-programmer provides information and feedback to students by asking questions and continuing only when correct answer given. Illustrations of model included.

18. McGuire, C. H., Wezeman, F. H. "Simulation in Instruction and Evaluation in Medicine," W.H.O. Public Health Paper, 610:19-35, 1974.

9 pages 11 references article
Descriptors: Intorductory, Physician Education, Iowa Eye Model, Sim I, CASE, patient management problems, teaching students, evaluating performance of students or others, Center for Educational Development, University of Illinois College of Medicine, Chicago, Illinois

Key Words:

Audio-video Simulations	Mannequins	Written Simulations
Computer Simulations	Simulated Patients	Cognitive Skills
Interpersonal Skills	Psychomotor Skills	[illegible]ation
Curriculum		

This introductory article describes use of simulation in medical education. Various type of simulations (audio-visual, mannequins, written, computer, simulated patients) are described and examples presented. Simulation can be used to teach and evaluate diagnostic, problem solving, psychomotor and affective skills. The effectiveness of a simulation as a teaching device depends on the fidelity of simulation and how it is used in the curriculum. Briefly discusses criteria in evaluating simulations and elaborates on advantages and disadvantages of using simulations. An assorted list of additional readings is provided.

19. Meadow, R. and Hewitt, C. "Teaching Communication Skills with the Help of Actresses and Video-Tape Simulation," British Journal of Medical Education, 6(4):317-322, December, 1972.

6 pages 7 references article
Descriptors: Historical/Descriptive, Physician Education, Teaching Students, University of Leeds, England

Key Words:

Actors	Audiovisual	Communication
Interpersonal Skills	Pediatrics	Physician Education
Simulated Patients	Videotape	

Describes a course in communication for medical students that entails simulated patients and videotaping of interviews. Gives background of three unsatisfactory methods of teaching the course that evolved into the present method. Gives detailed description of present method, including sample case histories portrayed (all involve pediatrics), training of actors and actresses, subsequent use of videotapes by students, student reactions, and technical aspects.

20. Miller, G. G. Some Considerations In The Design And Utilization Of Simulators For Technical Training. AFHRL-TR-74-65, Technical Training Division, Lowry Air Force Base, Colorado, August, 1974.

90 pages 53 references report
Descriptors: Historical/Descriptive, General, Teaching Students, Lowry Air Force Base

Key Words:

Costs	Development	Evaluation
Inanimate Models	Psychomotor Skills	Teaching
Utilization		

Reviews current technical literature related to simulators, training devices, and simulation in technical training. Includes rules and principles for cost-effectiveness. A major finding is that fidelity can be quite low in certain procedural tasks without a decrease in performance. Other studies indicate that some complex electronic equipment can be simulated in simple, relatively inexpensive devices without an adverse effect on training. In general, very few studies have been completed to validate the rules and principles of simulation developed over twenty years ago.

21. Munoz, D. G. The Effects of Simulated Affect Films and Videotape Feedback in Group Psychotherapy with Alcoholics. Unpublished doctoral dissertation, Michigan State University, East Lansing, Michigan, 1971.

22. Paxton, H. T. "The Electronic Patient," Hospital Physician, pages 57-64, May, 1970.

8 pages 0 references article
Descriptors: Intorductory, Historical/Descriptive, Physician Education, Sim I, Lazarus, Teaching Students, University of Illinois, Ohio State University, University of Oklahoma, University of Southern California, Latter Day Saints Hospital, Salt Lake City, Institute of Living, Hartford

Key Words:

Anatomy	Anesthesiology	CAI
Cardiology	Computer	Simulations
Continuing Medical Education		

Gives a brief description of computer-assisted instructional devices developed at several institutions. The programs described are patient simulations (University of Illinois), basic sciences (Ohio State), nutrition (University of Oklahoma), Sim I (University of Southern California), cardiology (Latter Day Saints Hospital, Salt Lake City), and psychiatry (Institute for Living, Hartford).

23. Penta, F. B. and Korman, S. "The Effectiveness of Simulation Devices in Teaching Selected Skills of Physical Diagnosis," Journal of Medical Education, 48:442-445, May, 1973.

4 pages 4 references article
Descriptors: Involves empirical study, Physician Education, Iowa Opthalmoscopy model, Strabismus Cover Test Demonstrator, Bartner eye model, heart sound simulator, Teaching Students, evaluating performance of students or others, University of Illinois College of Medicine

Key Words:

Diagnostic Skills	Evaluation	Teaching
Inanimate Models	Cardiology	Ophthalmology

Reports evaluation of four simulations used to teach physical examination skills to medical students. Simulations were (1) Iowa Ophthalmoscopic Model (2) Strabismus Cover Test Demonstrator (3) Bartner Eye Model (4) Heart Sound Simulator.

Medical students in physical diagnosis course received traditional instruction alone or traditional instruction and practice on simulations. Results indicate students using simulations scored better on tests of skills related to simulations one and two but not three and four. Suggests amount of time spent on each simulation is related to learning. Students who practiced more learned more.

24. Penta, F. B. and Penta, M. Q. "An Introduction to Physical Examination Simulators," Biomedical Communications, pages 12-13, 45-48, March, 1974.

6 pages 3 references article
Descriptors: Introductory, Historical/Descriptive, Physician Education, Teaching Students, University of Southern California, University of Illinois Medical Center

Key Words:

Costs	Diagnostic Skills	Endoscopes
Ophthalmology	Physician Education	Proctology
Psychomotor Skills	Simulation Laboratory	Mannequins

25. Schorow, M. "Problem-Solving Theory and the Practice of Clinical Medicine," Canadian Medical Association Journal, 97:711-716, September 16, 1967.

6 pages 5 references article
Descriptors: Historical/Descriptive, Theoretical/Conceptual, Physician Education, Teaching Students, Center for Study of Medical Education University of Illinois (Chicago)

Key Words:
Diagnostic Skills Management Skills Teaching

Presentation draws upon problem solving theory and discusses problem solving simulations as a bridge between learning as medical students and practicing as clinicians. Students must have experience in solving many new and different problems with full responsibility for decisions. The multiple branch, erasable Patient Management Problems developed by McGuire and Babbott provide such experience. However, the "cued" selections and constrained branching technique can be improved by computer programming of PMP's. The student interacts with computer in a more natural style obtaining realistic data but only at his request for data. An example of a computer simulated problem is presented. Both student and instructor can receive feedback which guides subsequent learning. The use of these techniques depends upon the problem solving needs of the particular medical curriculum. There techniques are self-pacing and self-motivating, which the author feels would facilitate the development of self-reliant problem solving clinicians.

26. Steward, D. K. Simulation: An Important Factor In Learning And Retention, Articulated Instructional Media Program AIM 4-5, CDS, 3-1, University of Wisconsin, Madison, Wisconsin, 1964.

20 pages 4 references paper
Descriptors: Theoretical/Conceptual, General Education, Teaching Students, evaluating performance of students or others, University of Wisconsin

Key Words:
Evaluation Development Curriculum
Decision Making Teaching

This paper is part of course development seminars at the University of Wisconsin. Presents conceptual discussion of simulations and its use within a system approach. Emphasizes role of simulation in facilitating transfer of skills from synthetic academic environment to real life experiences. Stresses need to simulate both physical and psychological aspects of real world. Present a taxonony of synthetic simulations, the selection of which depends upon the instructional objectives. Discusses evaluation within a system franework, history of simulators, and application to other general areas.

27. Twelker, P. A. Instructional Simulation Systems: An Annotated Bibliography. Corvallis, Oregon: Continuing Education Publications, 1969.

28. Twelker, P. A. "Designing Simulation Systems," Educational Technology, page 64-70, October, 1969.

    7 pages 4 references article
    Descriptors: Historical/Descriptive, General Education, Teaching Students, Simulation Systems Program, Teaching, Research, Oregon State System of Higher Education, Monmouth, Oregon

    Key Words:
    Curriculum Development Evaluation
    Process Models Audio-Video Simulations

    Outlines approach to designing instructional simulation systems in thirteen steps: define instructional problem, descirbe educational system, relate system to problem, specify behavioral objectives, generate criterion measures, determine appropriateness of simulation, determine type of simulation needed, develop specifications for simulation experience, develop simulation prototype, tryout prototype, modify prototype, conduct field trial, make further modifications. Discusses different types of simulations and when simulation is appropriate or not appropriate. Summarizes main ideas in graphic form.

29. Wagner, H. N., Jr. "Videotape in the Teaching of Medical History-taking," Journal of Medical Education, 42(11):1055-8, November, 1967.

    4 pages 18 references article
    Descriptors: Introductory, Theoretical/Conceptual, Methodological, Physician Education, Teaching Students, John Hopkins Medical Institution

    Key Words:
    Videotape Live Models Diagnostic Skills
    Communication Interpersonal Skills

    Description of a basic interviewing course in history taking. First, the physician videotapes an interview, then plays it back for the student with comments, and then the student does the same. Emphasis is on the benefits of using videotape.

30. Werner, A., Schneider, J. M. "Teaching Medical Students Interactional Skills. A Research-Based Course in the Doctor-Patient Relationship," New England Journal of Medicine, 290(22):1232-7, May 30, 1974.

Multi-Media Simulations

6 pages 16 references article
Descriptors: Introductory, Involves empirical study, Theoretical/ Conceptual, Physician Education, use of videotaped interviews with simulated pateints (DPR), Teaching Students, Evaluating performance of students or others, Michigan State University

Key Words:

Evaluation	Role Playing	Videotape
Communication	Interpersonal Skills	Nonverbal Communication
Physician Education	Research	Simulated Patients

Describes a course designed to facilitate the doctor-patient relationship and teach first year medical students to communicate and interact with patients more effectively. The course is outlined with a detailed explanation of the interviewing, videotaping, recall and evaluating.

SIMULATION CENTERS

1. Bryans, A. M., Southall, G. A., Valberg, L. S., Waldron, J. J., Valberg, B. and Kraus, A. S. "A New Type of Facility in Medical Education: The Clinical Learning Center," Journal of Medical Education, 50:277-284, March, 1975.

2. Lackman, J., Leveridge, L. L. and McGuire, C. Simulation and Self-Assessment. The Physician Self-Assessment (PSA) Study was conducted by the University of Illinois College of Medicine Center for Educational Development under contract to, and with assitance by, the American Medical Association Department of Continuing Medical Education under DHEW National Center for Health Service Research Grant #5 R 18 HS 01065, Fall, 1975.

   270 pages 0 references report
   Descriptors: Project report, PLATO computer simulations and CASE, Colenbrander eye model, Evans prostrate model, Teaching Students, University of Illinois - Center for Educational Development; American Medical Association - Department of Continuing Medical Education

   Key Words:

CASE	Computer Simulations	Costs
Continuing Medical Education	Development	Diagnostic Skills
Evaluation	Family Medicine	Opthalmology
Physician Education	PMP	Self Assessment
Urology		

3. Sajid, A., Lipson, L. and Telder, T. "A Simulation Laboratory for Medical Education," Journal of Medical Education, 50:970-975, October, 1975.

   6 pages 5 references article
   Descriptors: Historical/Descriptive, Physician Education, Cambridge Heart Sound Recorder, Heart Sound Simulator, Breath Sound Simulator, Colenbrander Opthalmoscopy Mannequin, Glaucoma Test Head Simulator, Strabismus Cover Test Demonstrator, Keeler Eye Model, Bartner Eye Model, Female Pelvic Model, Prostrate Palpation Model, Intravenous Injection Training Arm, Ear Simulator, Laryngeal Model, Lymph Node Model, Infant Intubation Model, Carotid Pulse Simulator, PLATO IV, Teaching Students, Center for Educational Development, University of Illinois, College of Medicine (Chicago)

   Key Words:

Physician Education	Teaching	Simulator Labs
Self Assessment	Self Instruction	Inanimate Models
Computor Simulations	Special Task Simulators	Simulated Patients
Psychomotor Skills	Diagnostic Skills	Interpersonal Skills

Describes simulation laboratory at University of Illinois (Chicago) College of Medicine. A description of the development of the lab is presented. The lab, the Learning and Resource Center, houses the simulations and its personnel aids faculty in developing and evaluating the simulations. Various specific simulations used by students to strengthen skills in patient examinations are discussed according to a five category taxonomy: three-dimensional replicas, electronic and recorded simulators, computer simulators, self assessment experiences, video interactions. Assistance to the student is available in the lab for each simulation. There is an accompanying instructional guide so that students may use the simulations in self-instructional format. Similar laboratories are established at the University of Illinois College of Medicine in Rockford and Peoria.

4. Stead, E. A. Jr., Smythe, C. M., Gunn, C. G., Littlemeyer, M. H. "Educational Technology for Medicine: Roles for the Lister Hill Center," Journal of Medical Education, 46 (Part 2):1-97, July, 1971.

98 pages 78 references journal
Descriptors: Introductory, Physician Education, Sim I, CASE, Teaching Students, University of Illinois, University of Southern California, Dr. Stephen Abrahamson, Dr. William Harless

Key Words:
Computer Simulation Diagnostic Skills Anesthesiology
Evaluation

A report on the evaluation and goals of the Lister Hill National Center for Biomedical Communication. The report focuses on recommendations for their over-all program with the long term goal of producing major improvement's in the system for medical education and health care delivery and a short term goal of effective application of existing communications technology in the service of medical education.

There is a brief section describing some of the work being done in simulation in Medical Education and computer programs for evaluating effectiveness with recommendations for further work in the area.

END